UNIVERSITY OF ARIZONA
39001007354452

UNIVERSITY
OF
ARIZONA
LIBRARY

This Volume
Presented to the Library
by

Carnegie Corporation
May 1938.

UNIVERSITY OF ARIZONA
LIBRARY

I

Swedish Man-of-War "Amaranthe" 1654

Gothenburg, Sjöfahrtsmuseum

SHIP MODELS

OF THE SEVENTEENTH TO THE NINETEENTH CENTURIES

BY

AUGUST KOESTER

WITH 124 PLATES

E. WEYHE

794 LEXINGTON AVE * NEW YORK * 1926

PRINTED IN GERMANY

UNIVERSITY OF ARIZONA
423.8
M78s
LIBRARY

In museums, inns of harbor cities, and at times in the churches on the coast as well as in townhalls and guildhalls one sees, enclosed in glass cases or hanging from the ceiling, small models of ships more or less carefully executed. Generally they are fully rigged and occasionally carry the full complement of sails that once drove the original of these models across the seas.

These small models are frequently the work of retired sailors, who fashioned them in the autumn of their lives in memory of their youth and their distant journeys. Many of them were made on board during the voyage. In the region of the trade winds, where the ship held her course for weeks under constantly full sails, the work on board would slacken up. All repairs had already been made, the ship had been repainted, oiled and tarred, and the deck scrubbed until it glistened in snow-white cleanliness. At such times one or the other of the Jack Tars produced a block of wood and began, with the assistance of the ship's carpenter or another old salt, to cut out a model of the ship on which he was sailing.

Experienced captains were not at all averse to the sailors engaging in such pastimes. It helped keep up interest in the daily work on a long voyage and was indeed much better than if the whole crew, merely for the sake of being kept busy, had been set to work for days or weeks scraping the cables or scrubbing the decks with the dreaded holystone. Naturally such woodcarving set an example, and two or three days later several other members of the crew would also be engaged in carving miniature ships. And before long the majority of the crew were deep in a contest at building ship models of various forms and sizes.

Although every real boy on the coast began in his early youth to carve and rig a ship for himself, the first attempts on board probably were often discouraging enough. However, practice makes perfect. With time and patience many a sailor became so adept that it was really a work of art which he produced. The majority of these models were perhaps never completed, and were either thrown overboard at the end of the voyage or disappeared in smoke in cooky's galley. Others, however, the more successful ones, adorned for years the sailor's modest habitation back home in the quiet village, in company with corals, ostrich-eggs and flying fishes, and remained the proud acquisition of the old seadog his life long.

The largest and best models came into the hands of shipowners or captains, or else, especially in the old days, were hung up in the village churches. Originally these were votive offerings to the gods, but in Christian days they were usually dedicated to Saint Nicholas, the patron saint of sailors. Later, when this significance had been forgotten or was no longer in harmony with the tenets of the church, the models were hung up in the churches either as souvenirs or, as is still occasionally done, merely because it had always been the custom.

115983

Among the sailors of today an artist of this sort is seldom to be found. There is so much to be done on board a large modern sailing ship that no time is left for such work. Economic reasons compel the few oldtime wooden ships that go on long voyages to carry such a small crew that no opportunity is left for making models, and hence none of the younger sailors have a chance to learn the art. In my childhood days I knew an old salt whom I often watched while he was rigging one of his models or starting a new one. I still wonder how he could manage to set up the thin spars and adjust the tiny blocks with his bent fingers, which showed the marks of more than forty years of life at sea. Every piece that he finished was as exact as if turned out on a lathe.

All these models, especially if destined as presents for the church at home or at times even for the King, were made with sacred earnestness, great diligence and wonderful cleverness, but even at best they remained solely more or less valuable decorative pieces, possessing a historical value only in so far as they showed the type of their original, with its masts and rigging. Only in very exceptional cases were these models such exact copies of an actual ship that they could be used as the basis for new construction.

The mistakes which they exhibit are due to the same reasons that lie at the bottom of so much inexactness in other branches of art. The copyist does not emphasize the main constructive principles, but only that which interests him especially, be it because of artistic or other reasons. Of course, what interests one should be shown and it is only natural that this leads to an exaggeration of proportions and that parts of the model become larger than they ought to be. Generally the anchor, as well as flags, standards, pennants, etc., or lifeboats or human figures on board, if there be any, were designed much too large. (see Plate 1.) The cannon were often made of really immense dimensions, while on the other hand the submerged part of the ship, which is usually not seen and the dimensions of which cannot usually be correctly imagined, were as a rule executed much too small. (see Plate 9.)

In contrast to all such models are those built by professional designers, whether shipbuilders or even patternmakers, that is, by a specialist in this field, such as used to be and even today are occasionally employed in the great shipbuilding yards. The models which they produced served the purpose of demonstrating to the constructor as well as to the person ordering the ship the type, kind and appearance of the vessel before work was started on it. Such a model is without question much more useful in demonstrating the form of the hull than the best description or drawing. Furthermore, not everybody is able and it demands much practice to read and to visualize the shape of the ribs, the waterline and the side view from a technical drawing.

Ship models have been made for this purpose at all times. It is said that

Phineas Pett, one of the most famous ship constructors that ever lived, built in 1634 a model of the well known man-of-war "Soveraigne of the Seas," to show the King how the proposed ship would look. During the course of construction such models, together with the technical drawings, served as patterns.

Very often shipyards or navy officials attempted to acquire models of ships not constructed in their own yards and which showed a type in use elsewhere, in order to give the constructors the opportunity of studying the new form of construction and, if they found something worth while, of employing it in their own work. Thus Peter the Great, who extended his shipyards systematically, had measurements made of all foreign ships which he could get hold of — especially captured vessels — and had models of them prepared, even of Turkish (Plate 50 and 103) and Tunisian (Plate 57) craft.

Models are also made today of proposed new constructions to demonstrate the type and also for experimenting as to the submerged form. A cast is made of paraffine of the model of the ship's hull, and this is towed through water in the tank of a special laboratory. Extremely fine instruments register the resistance of the water, and from the motion of the waves and water it is possible to determine through what slight changes of form this resistance can be diminished. Such experiments are continued until that form has been found which most easily cuts through the water and hence requires the least propulsive power. In this way the hull of the models and the drawings are corrected.

Since models executed for the actual construction of ships served a practical and economic purpose, they were usually made on rather large scale. As a rule their length runs from 3 to 6 feet, but there are many considerably larger. There is a model of a Swedish seventeenth century ship that was taken by the Russians at the capture of Sveaborg and is [illegible] in the Marine Museum at Leningrad, which is considerably more than 10 feet [illegible] (Plate 74).

As early as the seventeenth century, when shipbuilding was already regarded as an art and carried on according to scientific principles, a model was considered necessary and even indispensable. The great constructors of the age, masters in their professions, were all in possession of collections of models. This was for example true of Samuel Pepys and of the Pett Brothers. Phineas Pett himself constructed a small, fullrigged model in 1599. The Duke of York, later King James II, had a splendid collection, and in the middle of the seventeenth century Lord Sandwich occupied himself personally in constructing models. It was soon made the duty of the shipyards to make and keep models. Peter the Great founded a collection of models in the Admiralty at St. Petersburg. A collection of models was added to the construction room of the Royal shipyards in Copenhagen in 1696, and several patternmakers were even assigned to it. Some years later England followed suit. In Holland models were at

that time constructed in great numbers throughout the country. A book serving as an introduction to the construction of such models had appeared as early as 1664. This was Thomas Miller's "The Complete Modellist."

Ship models were regarded as especially valuable because of what they incorporated. Francis Sheldon, later a well known Swedish shipbuilder at Gothenburg, when fleeing from England considered a model as so valuable that he took it with him. (see R. C. Anderson, "Mariners' Mirror" X page 216.) In times of invasion special attention was always paid to getting the models out of the reach of the enemy. When Admiral de Ruyter appeared in the Thames with his fleet in 1666, the greatest anxiety of Peter Pett was to bring his models into a safe place. He used a royal ship for that purpose, and later, being criticized, replied that it would have been more to the advantage of the enemy to have taken his models than to have captured a number of ships, and that the King would also have suffered more through the loss of the models.

With what care the models were kept can be seen from the fact that in Copenhagen it was strictly forbidden the employees to light a fire in the model pavillion. Glue could not be heated in the workshop. The carpenters had to go to the blacksmith shop on the other side of the canal for that purpose. When, despite all these precautions, a fire broke out in the shipyards, attention was first directed to carrying out the models and they were saved from the flames with such wonderful daring that only a few were destroyed.

In the seventeenth century and even later ship models were so highly prized that if they contained no construction secrets they were given as presents to royalty. The model of a Dutch flagship was presented by the States-General to the Prince of Orange in 1660 at the time of his visit to the Dutch fleet. (Overzicht van de Historische Afdeeling op de eerste Nederlandsche Tentoonstelling op Scheepvaartgebied door J. F. L. de Balbian Verster, p. 10 et seq.). This model is now the private property of Kaiser Wilhelm II and can be seen in the Hohenzollern Museum in Berlin (Plates 15 and 16). The City of Danzig gave a beautiful model to August the Strong (Plate 10). William III of England presented Peter the Great on numerous occasions with beautiful models of English men-of-war (Plate 24). At the marriage of Peter's daughter Anna with Duke Karl Friedrich von Holstein-Gottorp, the bride received as a marriage present from the Tsar a ship model which he had carved with his own hands. Several decades ago this came again into the possession of the Admiralty at Petersburg and is today in the Marine Museum at Leningrad, still decorated with the standard of Oldenburg.

Several Russian models, at present in the private possession of H. R. H. the Grand Duke of Oldenburg (Plates 46 and 47), can probably be regarded as gifts of the Russian court to the house of Holstein-Gottorp. Tradition asserts

that Peter III, the son of Duke Karl Friedrich von Holstein-Gottorp and of his spouse, Grand Duchess Anna Petrovna, the daughter of Peter the Great, received them as playthings when a boy from his aunt, the Empress Elisabeth. Their present condition (Plates 46 and 47) shows, however, that they were never used as playthings, for models do not usually endure such "service" well. (see John Brinkmann, "Kasper Ohm un ick," chap. VIII, "De Slacht bi Abukir.") And in any event, the young Duke was already fourteen years old in 1741 when Elisabeth ascended the throne, and when she would have been for the first time in position to make such a present. It is nevertheless still possible that these models were once in his possession.

It is not especially fortunate for the study of types of sailing ships that among the models preserved, especially the good and historically valuable ones, the man-of-war predominates. This is due to the fact that the state shipyards, where the warships were built, kept their models in better and safer condition than was the rule elsewhere. The difference between a man-of-war and a merchantman is, it is true, so slight that in time of war every sort of craft that floated could be used for fighting purposes. According to the customs register of the Sound (Nina Ellinger Bang: "Tabeller øver Skibsfart og Varetransport gennem øresund", Copenhagen, 1906) we learn that about 2000 Dutch ships passed through the Sound yearly. Of these, 60 to 80 were of more than 100 tons. In 1588, on the other hand, only 4 Dutch ships of more than 100 tons passed Elsinore. The Dutch at that time, in anticipation of the arrival of the Grand Armada, had added numerous merchantmen to their war fleet. (Bor, "Nederlandsche Oorloghen," III. XXV, p. 5 et seq. See also Duro, "La Armada invencible," II, p. 64). The fleet which the English sent against the Armada con sisted of 197 ships, of which only 37 were really warships, the others having been built and intended for commercial purposes.

As a consequence of the insecurity at sea, the traders also, and especially on long voyages, such as to the East Indies, had to be well armed. They had so many guns on each broadside that they closely resembled warships. (Plates 4 and 40.) History records that they only seldom went out of the way of a real warship, and that they were able successfully to carry through a combat with it. The models, especially the older ones, show a well armed broadside. But this is not the only point of resemblance: the type as a whole has grown out of the warship.

Upon the disappearence of the Vikingships, really men-of-war, from the sea, a new type of ship, the broad and heavy "Koggen" took her place. This sort of vessel, at times known under another name, became shortly the prevailing type of seagoing ship and could be met with on all seas. It was very easy to transform the "Koggen", originally merchantmen into men-of-war. On the stem and

the stern post a high scaffold was erected on which the soldiers could fight. These "castles" were at first only present when needed but in course of time they became regular parts of the ship. As early as the 14th century the majority of merchantmen were provided with such structures and finally they were built as an integral part of the ship's hull. The superstructures at first included a half-deck, a quarterdeck and a poopdeck. Later, however, these were still further developed and increased in height. The Spanish and Portuguese galleons which in the 16th century, because of the increased passenger traffic, needed spacious accommodations had at times enormous superstructures. E. van Meteren mentions in 1592 a galleon "Madre de Dios" having seven decks one above the other. The same author states that a Portuguese ship, which was captured near St. Helena by the Dutch had, according to a report of the Dutch captain, "castles" as high as the foremast of his own ship. Such high superstructures were really not practical. The ship was liable to top-heavy and its sailing qualities were extremely lessened. The superstructures presented too great surface to the wind, caused the ship to drift strongly and prevented it from catching the wind well.

In the middle ages the ships were not first class sailers, especially as long as a craft carried only one square sail. However, the statement that a ship could only sail with the wind, or at least only with quarter winds is a great exaggeration. As early as the 12th century, it was possible for the broad, heavy "Koggen", under certain circumstances, to tack against the wind. According to the report of a crusader about 1189, we are informed that the fleet of the German, Frisian and Flemish crusaders made the trip from Cadiz to Gibralta against headwinds. "Sicunt solent nautae, in diversa velificantes contrarietatem flatus arte delusimus" (J. B. da Silva Lopes, Relaça o da derrota naval e successos dos cruzados 1189. Lisboa 1844 p 49).

The "Koggen" were entirely sufficient for the traffic of that time. When, however, in the period of discovery, the sea-routes were altered and the traffic possibilities greatly increased, other ships, absolutely reliable, were needed for the ocean voyage. Such ships had to be able to hold large quantities of merchandise, to carry a large number of passengers and to sail in such a manner that a least a rather safe and certain journey could be assured. Considering that the old rigging, which consisted of a single mast and a single large square sail, had maintained itself for centuries, the 15th and 16th centuries brought rather rapidly a new and more advantageous arrangement of sails. This period marks also great progress in ship construction. About 1600 a type of seaship had been found which was large, stable, and seaworthy, satisfying all requirements. In details, of course, there was still room for improvements, as the developments of the next century showed.

The type of sails used in and from the 16th century onwards, and as the

models of our first plates show, differs from the old system in that the principle of the arrangement of the sails, which maintained its validity until near the end of the era of the sailing ship, had already been adopted to a certain degree. When one began to construct larger ships, the single square sail, in order to correspond with the increasing size of the ship's body, had to made so immense and clumsy that it could hardly be handled in heavy weather. To obviate this, the ship was provided, as had already long been the custom in the Mediterranean Sea, with several masts. The two "castles", fore and aft, were given each at first a very small mast with a lateen sail, and in this way the steerage of the ship was greatly improved. In the course of time, these masts are lenghtened and the foremast, being made almost equal to the mainmast, was provided with a large square sail, while the lateen sail still remained on the stern mast. This latter was designated by a term borrowed from the Mediterranean peoples "mezzane" really middle mast; through which are derived "moysan" "mesam" "besan". This last expression is still to be found on the northern seas and continues especially in the command so well liked, "Besanschoot an" or as the English say, "splice the main brace".

Passages of literature as well as sketchings and city seals inform us that even long after the 14th century a single mast and a single sail were still considered sufficient. As early as 1450, however, caravels of Brittany exhibit the two subsidiary masts, and the large "Peter von La Rochelle", the first three-master of the north seas, had in 1462 a foremast with a square sail. One could already say that the area of the former single sail had been distributed among several sails. A still further division now shortly followed. The "Santa Maria of Columbus" carried above the main sail a topsail and in connection with the English ship of war "Regent" which was launched in 1489 the topgallant sail is first mentioned. The substitute for the „Regent," the "Henry Grace à Dieu" built in 1515 carried a topmast and a topgallant mast, top and topgallant sails ond also fore and main masts. Several lateen sails, one over the other, were placed on the mizzen mast. It is true that the top and topgallant sails were still comparatively small. The lower sails were still considered as the principle ones and were still cut with such big bellies that gusty winds could not sufficiently be taken advantage of. The size of the topsails increased in the second half of the 16th century. As a consequence of the invention of Captain Kryn Wouterp von Enkhuisen, the top masts were now so constructed, that they could be lowered and it was now, furthermore, possible to remove the top rigging in times of heavy sea or approaching storm. The masts, and especially the top masts, could be made much larger. In this way more space was made for the topsails and topgallant sails. The models (see Plates 1 and 2), dating from the beginning of the 17th century show that well balanced proportions already existed between the various sails.

The sole function of the bowsprit in ancient times was to support the foremast by means of a stay. Only later was it useful in connection with the sails. Another sail, the so-called blind sail, was placed on a yard under the bowsprit. About 1600 it became customary to erect a small mast on the end of the bow sprit, to which was attached a square sail. It is an exceptional indication of the lively commercial intercourse of the time and of the rapid interchange in nautical matters as well as of the progress in ship construction that this ship mast, in a few years, had been adopted by the various nations and could shortly be seen on all seas.

As a remnant of ancient times, the great top, the topcastle, from which cannon or hand firearms were used, could still be found on many ships of the 17th century. Even antiquity was familiar with this top; we meet it first in an Egyptian representation of about the 13th century B. C. (see A. Köster, Das antike Seewesen III. 6) and it was in use during the whole middle ages. Originally barrel-shaped boxes were hoisted, when necessary, on the foreside of the masts. The legal regulations of many a country provided that, although a ship might enter its harbors with hoisted topcastle — this was necessary for the look-out — before docking at the pier it must be lowered. It was only toward the end of the 14th century that the topcastle became large stable tops, extending around the mast and provided with a railing (Plate 1). With the increase in the number of sails, however, much of the original importance of the top was lost.

A certain identity in the form of the ship's hull had been reached in the various countries (Plates 1-15). A modest forecastle in the fore and a quarter-deck with poop aft were all that remained of the high superstructures. The high afterdeck as well as a structure projecting from the stem in the form of a bird's beak, taken over from the galleon, are characteristic of the form of the ship. The prow, called „gallion" in German (cutwater) after the old galleons, originally probably intended as a ram or spur, has only decorative value and is consequently usually decorated with carved wood, formed in figures, which even today are known in German as the "gallion figure" or the figurehead. A gallery is usually found on the stern (Plate 12). In the course of the next century, this was generally doubled or tripled and played an important part in the execution of the stern moulding. The various views (Plate 5, 6, 13, 43, 45, 47, etc.) well show how this gallery was shaped from time to time. Details as to the stern mouldings as well as to the figure-heads and other decorations of the ship have been recently extensively described by L. G. Carr Laughton in his book "Old Ship Figure-Heads and Sterns," London, 1925.

The escutcheon under the stern moulding is usually rounded in the ships built by the English (Plates 18—45) and the Scandinavians (Plates 10, 13, 22), while on the other hand the Dutch adopted the flat escutcheon from Brittany and continued using it for a long time. The so-called Caravel planking was

also copied from Brittany and because of the great advantages which it offered was introduced generally in large ships as early as the year 1600.

Although the Caravel planking had been used from immemorial times in the Mediterranean, and the Scandinavians had been acquainted with and often employed it, even in the earliest days (Hjalmar Falk: Altnordisches Seewesen, p. 49), the clinker planking was usual on the northern seas during the whole of the middle ages. In this system, the rows of planks were laid one over the other like tiles of a roof. The ship constructors of Brittany introduced in the years 1450—60 the Caravel planking, which had many advantages for large ships. Above all, the outer sheathing could be made much stronger and two rows of planks could be laid on each other. This method of construction and new type of ship derived its name from the sort of ships used by the Spanish, Portuguese, etc. — the so-called Caravels, the planks of which were arranged in this manner (see The Mariner's Mirror, III, p. 265. Nance). The construction of Caravels in Holland was begun as early as 1459 at Zierikzee, where a ship-constructor of Brittany, by the name of Julian, was working (Chronick van Zeelandt, eertijdts beschreven door d'heer Johan Reygersbergen, nu verbetert ende vermeerdert door Marcus Zuerius van Boxhorn 1644. II, p. 233). In the next year the first Caravels were being built at Hoorn. In the summer of 1462 Marot Boeff, with an enormous Caravel called "Peter de La Rochelle," later "Peter of Danzig," went from La Rochelle to the Baltic, where his ship, as the result of damage caused by lightning and the disputes arising therefrom, lay 8 years in the harbour of Danzig. Of course the ship-constructors of that town did not neglect to take advantage of this opportunity and in a very short time learned so much that the Caravel planking became general also in the Baltic.

A peculiarity of the great ships of the 17th century is that in the cross-section they taper not unnoticeably toward the top. The English expression is, they "tumble home." (Plate 87.) The result of this is that the channels, where the shrouds are fastened to the hull, must be placed very low. This is especially the case with the main and forelower shrouds (Plates 11, 12, 15, etc.), so that here the channels lay often between the lowest and next higher battery.

The invention of gunpowder and the use of firearms in warfare at sea exercised, of course, its influence on the methods of naval warfare and on the construction of ships, especially men-of-war. It is true that the introduction of firearms followed very slowly and gradually. It took over two hundred years until a ship armed with cannon was really of superior value in a combat. Cannon are at first found on shipboard in the Mediterranean. They are first mentioned as being employed in the fleet of the Bey of Tunis, who used them in a sea battle against the Spanish Moors in 1333. So far as we are informed, cannon were first used in the northern seas in 1362 in the battle between

Waldemar IV and the Hansa League outside of Copenhagen. So much was left to be desired in respect to the accuracy, the range and the rapidity of firing that for a time cannon did not take the place of the old catapults — remnants of antiquity. In the first place, it was small cannon with which ships were armed. The "Regent," launched in 1489, carried 225 very light cannon, and it was not until the „Henry Grace à Dieu" was built in 1512—14 that a ship was armed with heavy cannon. Apart from firearms, the old weapons were still used and considered superior. The „Henry Grace à Dieu" carried on board 500 bows with accessories. Even the large ships of the Armada still had numerous archers. It can be seen from the fact that in a combat between the French and English in 1545, only 300 shots in 2 hours were fired from the 200 ships of both fleets, how little cannon were able to accomplish. The light cannon and serpentines were placed in and on the "castles." Not until heavier calibers were used and the cannon placed on the broadside was the fighting value of the ships increased. Since about the year 1500, it was customary to cut portholes out of the planking of the ship. In this way it was possible to bring several rows of cannon along the whole of the ship's broadside. Another advantage of this was that the weight of the heavy cannon — a rather serious factor — could be brought down near the surface of the water and the ship in time of storm rode on more even keel.

The portholes of the ships of war were, in part, only a short distance above the sea level. (Plates 12, 17, 21, 32.) On the "Great Michael," a large man-of-war of about the year 1500, they were only about a foot and a quarter above the sea, and more than 350 years later, in the Crimean war, the lowest portholes of the three-deck "Duke of Wellington" were about a foot and a half above the water line. The result of this was that in heavy seas the lowest row of portholes had to remain closed and a whole line of cannon was rendered useless. In the battle against the Armada, Howard, who left Plymouth the 19th of July, could not use his lowest battery until July 25th. In the battle of Quessant (July 27, 1778) during the American War of Independence, the lower batteries could not come into action at all. Accidents were occasionally caused by the portholes being placed so low. Thus, the lee portholes of the "Mary Rose" were flooded with water in 1545 near Spithead and the ship capsized (Walter Raleigh, Indicious and Select Essays and Observations, London, 1650, p. 18). Such cases have very often happened, even in the last years of the sailing ship period. The fate of the English sailing frigate "Euridice" offers an example. In a storm wind on March 24, 1878, she was keeled so heavily to port that the sea flowed in through the open portholes and she sank in a few minutes. Even today, under certain conditions, such an accident is liable to occur. On the trip of the Russian squadron under Rojestvensky to East Asia in 1905, so much

coal had to be taken on board at times, there being such lack of coaling stations, that the ships lay very low and it was feared the portholes would be smashed in and the batteries overrun with water (Semenow, Rasplata, p. 334).

A thoroughly new form of ship, destined to play a great part for centuries on all seas, even in the most distant places, arose toward the end of the 16th century at Hoorn in North Holland. The occasion of this type of ship was the attempt to build a form suitable to the shallow Dutch waters, but at the same time capable of competing with large sea-going craft. Velius writes in his "Cronijk van der stadt Hooren," which appeared in 1604: "In this year (1595) ships were here constructed for the first time, called 'gainzen' or 'fleuten' of Hoorn, being four times as long as broad, at times still longer. They were well adapted to sailing, as they lay good to the wind and did not draw very deep. For this reason they were so sought after that in 8 years, to the great profit of the citizens, more than 80 such ships had been completed in Hoorn." This method, so succesfully begun, was continued in such a way by the shipyards of Hoorn that the above mentioned writer in the 2nd edition of his book, appearing in 1617, could add the following to his statement: "Later they were constructed much longer; five to six times as long as broad. Peter Janss Livorne was the leading spirit in this innovation. The neighbors at first sneered at this method of construction, calling it foolish and useless, but later they themselves were forced to copy these proportions, otherwise they would have been themselves eliminated as competitors."

According to the statement of Velius, we see that the new form of ships in the first place had a much greater length in proportion to width than had heretofore been customary. They were usually rigged as threemasters and provided with somewhat longer masts but shorter yards. The sails were no longer cut with vertical ends, but in the form of a trapeze. The main sail was smaller, but the top sail and topgallant sails larger. The whole arrangement of the sails was much easier to handle and a smaller number of sailors was required.

Instead of the flat escutcheon in general use in Holland, the fleuten were built as "rundgatt," usually without escutcheons, or with very small ones (plate 28), as was especially liked in the shipyards of the Baltic (see The Mariners Mirror, II, pg. 211). The fleuten, which were furnished with such an escutcheon, seem also to have been called pinnace. The body of the ship was kept comparatively low, even the larges tof the fleuten having only two decks.

The purpose of all improvements was to combine great carrying capacity with the highest possible sailing ability and to limit the crew to a minimum. The great earning capacity attained in this way gave the fleuten such a predominance over all other commercial ships that in a very short time they were to be found in triumphal progress on all seas and had taken the greatest part of

the world's freight traffic. As early as 1612 the ship owners of Lübeck demanded special legislation against the Dutch fleuten and attempted to compete with them by building themselves a large number of fleuten. Other cities and countries followed this example.

It was a natural consequence that an overproduction of ships took place leading to an economic crisis. As early as 1616 Dutch experts were seriously concerned as to the exceptional success of the fleuten. They said (Heeringa, Bronnen tot de Geschiedenis van den Levantschen Handel I p. 679 sq.): that through the damaging greed iness of a few persons it is being tried from day to day, in increasing measure, to send to sea merchantmen of the fleuten type at the least cost and with the smallest crew. The existence of many an experienced seaman is in this way destroyed and the merchants deprived of his services. The masses are without work and cannot get sufficient wages to earn an honest living. They are forced to undertake improper voyages in foreign service and at times in the pay of the enemies of Holland's prosperity in order to support their wives and children. The number of new sailors is decreasing as there is no future in the service. In the same way many honest merchants who endeavour to carry on their trade in somewhat greater safety are not a little discouraged in their business when they see that the wares that are carried over sea in fleuten and gaingen with so little difficulty destroy the common market and monopolize all the profits.

It was not law, however, which finally prevented the fleuten from maintaining their economic advantages. The insecurity on the sea forced ships to be more strongly armed or made them sail together in fleets under the protection of convoy-ships — in which case the rate of speed had to be determined according to the slowest ship. Nevertheless the fleuten in their original type remained in use in Holland up into the 19th century, while in the Baltic Sea the influence of this type of construction could long be seen in the craft there.

It is extremely difficult to follow the further development of the sailing ship up into modern times. All ship yards were continuously busy devising new types of ships according to the particular demands of the traffic. The legal regulations concerning harbour fees, pilotage etc. as well as the subsidies and premiums granted by the various states were not without influence on the type of ship. The ship of war developped along its own special line and was most successful, especially in a technical way because no heed had to be taken to the business end of the matter, while the question of profit was always of first importance with a commercial ship.

The XVII. century brought many innovations to sailing ships, which were real and permanent improvements. It was the XIX. century which once more fundamentally changed the type. This came about through the influence of the Americans. As a result of the Napoleonic wars, the European sea traffic fell off

greatly and the European merchant fleet suffered severely. America captured the field. With great confidence it saw its opportunity and it succeeded by perseverance and endurance, not only in building up its merchant fleet in a short time, but also in introducing new types of ship — especially in constructing a speedy sailing ship, the sharp lined "clipper" —, so productive that it was not easy for the European shippers to regain the ground lost. The American types served as models and gave another form to the European ships. Their influence was so great that it is still met with to-day. One notes this influence in our large modern sailing vessels and it can easily be recognized that the American clipper was a most important factor among their predecessors.

DESCRIPTIVE PART

1. Hanseatic Convoy. 1603. The date of this model is determined by the inscription. Two further figures — 1715 and 1822 — indicate that it has been renovated two-times. Apparently, in the course of the renovation, the sails of the several masts had been exchanged and the bowsprit with the original rigging removed. The lanterns as well as the sailors were added at the time of the last restoration. The sails are painted on both sides. They show the picture of a man, the coat-of-arms of the "Peller" family, furthermore Mercury, a sea nymph, a pelican, and the sun and the moon. The model is executed carefully and exactly. (M. Nance, Sailing-Ship Models, Pl. 11.)

2. Dutch Men-of-War. 1627. This oldest model of Holland shows a rather good type of its time. The rigging and the sails do not seem to have been renewed. (Chr. Voigt, Schiffs-Aesthetik, p. 113, fig. 86.)

3/4. Dutch East India Man "Prins Willem". 1649. This model was for a long time in the possession of a Dutch East India company and was discovered in its original condition in a ware-house of this company at Middelburg. The ship was built in 1649 and after its first trip to the East-Indies was put in the navy and badly damaged in the battle "in den Hoofden" (Oct. 8, 1625). The ship was lost in 1662 off the coast of Madagascar. The model is exceptionally well executed; especially.

5. The stern of "Prins Willem". This shows the figure of Prince William II of Orange, the monogram V. O. C. M. (Vereenigte Ostindische Compagnie Middelburg), as well as the coat-of-arms and a view of Middelburg. (K. Chatterton, Ship-Models, pl. 28, 29, 31. M. Nance, Sailing-Ship Models, pl. 21. Nederlansch Scheepvaart-Museum, Amsterdam, Platen Album, p. 35 sq.)

6. Dutch Admiralty Yacht of about the year 1660. This model is not executed very delicately but carefully and exactly and it is possible to recognize easily the earlier type of these yachts. The escutcheon (plate 5b) shows the large windows which were customary in yachts up to recent times and which here are placed above the emblems of war.

7/8. Swedish Man-of-War "Amaranthe". 1654. The original of this model is in Stockholm. It is well preserved and executed with exactness. The model in Gothenburg is an exact copy of the original. The stern shows the Swedish coat-of-arms under a crown. (Hagg, The Mariners Mirror, III, p. 204. Nance, Sailing-Ship Models, pl. 22. L. G. C. Laughton, Old Ship Figure-Heads and Sterns, pl. 15.)

9. Two-Decker of Lübeck, about 1650. The large size of the cannon as well as the much too small hull indicate that the model was used for decoration. The rigging and the sails have been renewed but appear to conform rather exactly to the original condition. (Fr. Schulze, Alte Schiffsmodelle aus dem Hause der Schiffergesellschaft. Lübeck 1912, Plate 5).

10. Two-Decker of Danzig, about 1660. This model was presented to August The Strong by the city of Danzig. It is well preserved although not entirely free from additions. The type shows strong Dutch influence.

11. Dutch Flag ship 1665. A model of the type of the "Hollandia" (1665—1683). The escutcheon probably not originally belonging to the ship has been recently removed and replaced by a copy of the escutcheon of the "Hollandia". The cannon as well as the sails are modern.

The model is exceptionally well executed. (J. F. L. de Balbian Verster, Platen Album of the Nederlandsch Historisch Scheepvaart Museum, Amsterdam, p. 37. K. Chatterton, Ships Models, pl. 27. M. Nance, Sailing Ship Models, pl. 28. The Mariners Mirror, IV, p. 106, G. C. E. Crone. L. G. C. Laughton, Old Ship Figure-Heads, pl. 35.)

12. Two-Decker of Danzig, about 1650. A Danzig model of excellent construction. It bears the inscription of the dates 1697, 1755 and 1831 and accordingly has been renovated several times. The bow sprit with jib-boom, martingale-boom and the yards for the blind sail have been given in this way an impossible form. Originally of course a small sprit mast stood on the end of the bowsprit. The escutcheon (plate 13) shows the Danzig coat-of-arms.

13. Escutcheon of the "Zeelandia" (Pl. 14) and of the Two-Decker of Danzig (Pl. 12). In comparing these two escutcheons one must recognize Hollands influence on the ship-yards of the Baltic Sea.

14a. Dutch Flag ship "Zeelandia". 1662. Launched in 1653 it had been the flagship of Admiral Jan Evertszen until 1664. The model which was made in 1662 has been recently successfuly restored by van Nouhuys, director of "Prins Hendrik" Museum. (Verslag v. h. Maritiem Museum "Prins Hendrik" to Rotterdam XXXVIII, 1921, p. 3, pl. 1. K. Chatterton, Ships Models, Pl. 26, 30. M. Nance, Sailing Ship Models, pl. 27.)

14b. Dutch Merchantman, about 1630. This is a perfect model of a Dutch merchantman under way to the East-Indies, whose type is exactly the same as that of the Men-of-War. The model is exactly and carefully executed.

15/16. Dutch Flag ship, about 1660. This model, private property of emperor William II, was presented in 1666 by the Admiralty of Amsterdam to Prince William of Orange, when he visited the fleet, lying before Texel together with other royal personages. After his death it came into the possession of the House of the Hohenzollern together with the estate of the House of Orange. The model which is very well executed shows the Amsterdam type of construction and probably represents the "Hollandia", which had shortly before been launched. The escutcheon shows the coat-of-arms of the Prince of Orange surrounded with the "order of the garter". The boats belonging to the model show the coat of-arms of Amsterdam and of the admiralty. (J. F. L. de Balbian Verster, Overzicht van de Historische Afdeeling op de eerste Nederlandsche Tentoonstelling op Scheepvaartsgebied. Amsterdam 1913, p. 10 sq., pl. 15. Ch. Voigt, Schiffs-Aesthetik, p. 31 sq., Fig. 25—27, M. Nance, Sailing Ship Models, pl. 23—25. Chr. Voigt, Schiffbau XXIII, 1922, p. 1261. Brandt, Die Yacht 1925, p. 17.)

17. Hanseatic Man-of-War, about 1650. The model is not very carefully executed but apparently according to a good original. The coat-of-arms of Mecklenburg is to be seen on the exceptionally large blind sail.

18a. Danish Frigate "Blaa Hejren". 1734. The frigate (18 cannon) built according to this model and launched in 1734 in Copenhagen was employed in the traffic to the West-Indies until 1755. (Jordening, Catal. p. 47.)

18/19. Danish Royal Yacht. 1695. Probably constructed by Admiral Span. The escutcheon with the insignias of the "order of the elephant" indicates that the date of construction is to be placed at least after 1693, as in this year the order of the elephant was founded. The

royal order of April 26, 1692, according to which, in the case of ships of war, decorations in form of wood carving etc. should be reduced to a minimum, does not refer to royal yacht. Consequently the date of this order cannot be applied in ascertaining the year of construction of this richly decorated model. The frigate was armed with 24 cannon. The escutcheon bears the initials of Christian V. (B. W. Jordening, Katalog over den historiske Modelsamling paa Orlogsvaerftet, p. 26. N- 3.)

20. Lübeck Two-Decker "Die Hoffnung". 1686. The large flat escutcheon (see plate 81) which is not seldom found on craft of the Baltic Ocean but which does not conform to the method of construction of Lübeck apparently indicates that the original of this model was not a Lübeck ship. The sails are renewed in part. (M. Nance, Sailing-Ship Models, pl. 36.)

21. Danish Two-Decker "Prins Carl". 1696. The two men-of-war "Prins Carl" and "Prins Wilhelm", each armed with 50 cannon were built at the same time in the royal shipyards of Copenhagen, according to this model and launched on the 15th of October 1696. At the time of the fire of 1795 the model was somewhat damaged and in consequence has been repainted. (Jordening, Katalog over den historiske Modelsamling, p. 28 sq.)

22. English Yacht, about 1680. This small well executed piece is probably, as Mr. C. G. t'Hooft informs me, a model of the English royal yacht "Folly". The figure head of a rider on a sea-horse is not seldom found in England but is extremely unusual in Holland. That is also the case with the upper mast and the decoration of the top rows of planks. Furthermore the escutcheon bears the English coat-of-arms. (The Mariners Mirror, V. p. 121.)

23. Dutch Admiralty Yacht, XVII. Century. As is the case with the majority of Dutch Yacht-Models, this is delicately and carefully executed and even in so far as the rigging is concerned thoroughly reliable. (K. Chatterton, Ship Models, pl. 58.)

24a. English Two-Decker, 66 cannon. A present of King William III to Peter the Great.

24b. English Three-Decker, 100 cannon. See: The Mariners Mirror, IV, p. 69. According to the clear explanation of Robinson and Anderson it seems to be certain that this is a model of the "Royal Sovereign" of 1701. As, however, according to Russian statements Peter the Great received that model as early as 1697 as a present from King William III, it was probably executed about 1695.

25. Danish Two-Decker, about 1680. This model not built on a frame is probably not a copy of any definite ship of war. It is armed with 66 cannon. (B. W. Jordening, Katalog p. 25.)

26. English Two-Decker. 1684. This model of 54 cannon comes out of the collection of the Austrian Imperial House.

27. Hanseatic Three-Decker of the 17th century. (F. Schulze, Alte Schiffsmodelle aus dem Hause der Schiffergesellschaft. Lübeck 1912, pl. 7.)

28. Dutch Flight, about 1640. This excellent model shows nicely the peculiarity of the Dutch "Fleuten", especially the weak armament and the preference for large top sails. (M. Nance, Sailing-Ship Models, pl. 20.)

29. Lübeck Flight, 1700. The strong armament indicates a change in the condition of the times. (F. Schulze, Alte Schiffsmodelle aus dem Hause der Schiffergesellschaft Lübeck 1912, pl. 3.)

30. Lübeck Flight „Der Löwe" 1690.

31. Lübeck Flight "De jonge Johann". 1712. Both ships show the type which was popular at the end of the 17th century in the shipyards on the Baltic Sea. This type is derived from the Dutch "Fleuten" and has a small escutcheon. Sometimes it is called "pinasse". (M. Nance, Sailing-Ship Models, pl. 50.)

32. Swedish Man-of-War, about 1700. The hull and the rigging are hardly of the same period. Certain details do not appear, at least in part, to be original so that it is impossible to set an exact date for the ship. (M. Nance, Sailing-Ship Models, pl. 32.)

33. Hamburg Convoyship. 1700. This excellently preserved model that approaches the Dutch type is unfortunately defaced by the renovation of the foregear. Much of the rigging of the masts has also been restored. (Mariners Mirror, VIII, p. 334.)

34. Lübeck Flight, about 1720. This model, somewhat older than that of Plate 35, is so similar to this latter, that it probably represents a Lübeck ship. The small escutcheon recalls the older Lübeck models on Plates 30 and 31. The rigging up to the top gallant mast is original. Bowsprit, jib-boom and martingale-boom are of a later period. (Fr. Schulze, Alte Schiffsmodelle aus dem Hause der Schiffergesellschaft Lübeck, pl. 9.)

35. Hanseatic Flight, about 1730. Decidedly a merchant man which according to its heavy but strong construction was built for long voyages. The model which is excellently preserved shows the type of the large craft of the Baltic Sea about the middle of the 18th century. The rigging is modern.

36. Dutch East-India Ship. 1710. The model is executed very simply. All decorative accessories are lacking, even on the escutcheon. The unusual gallery can hardly be original.

37a. Dutch East-India Ship "Padmos". Resembles externally very closely the East-India ship of the preceding plate. The construction of the two East-India ships "Blydorp" and "Padmos" which were regarded as the finest ships of the East-India Company was started in 1722 and 1723. (K. Chatterton, Ships Models, p. 33, pl. 72.)

37b. Dutch Two-Decker "Princes Carolina". 1757. This model bears, it is true, the name „Veenlust" is however, very probably, the Dutch Man-of-War "Princes Carolina", built in 1747 by Pieter van Zwijndregt in the Admiralty Ship-Yards. (Verslag van het Maritiem Museum "Prins Hendrik" to Rotterdam. 1922. Pl. VIII. K. Chatterton, Ship Models, p. 35, pl. 83.)

38a. Escutcheon of the East-India ships "Blydorp" and "Padmos" which in its form diverges entirely from the escutcheons previously usual. (C. Laughton, Old Ship Figure-Heads and Sterns, pl. 38.)

38b. Escutcheon of a Man-of-War, which is a forerunner of the horseshoe form, as already found on the "Padmos", "Den Ary" (see plate 39/40), etc. It diverges, however, in details from the Dutch form.

39/40. Dutch East-India Ship "Den Ary". 1725. This model is exceptionally carefully executed and well equiped. It shows exactly the same technic as the galley executed for Peter the Great which is in the Rijksmuseum in Amsterdam (Plate 55). Therefore, it can be con-

cluded that also this model was destined for Peter the Great but completed only after his death and thereupon remained in Holland, as in the case of the model of the galley. It was executed in the year 1724—27. The escutcheon bears the coat-of-arms of Batavia as well as the date 1725. The silk war-flag of the staff of generals and also the Jack are original. The rigging has also remained undisturbed. An actual ship bearing the name "Den Ary" is not known. (J. F. L. de Balbian Verster, Platen Album, p. 42, M. Nance, Sailing-Ship Models, pl. 75, C. Laughton, Old Ship Figure-Heads and Sterns, pl. 15.)

41. Dutch Two-Decker, about 1720. The rigging has been inexactly renewed.

42/43. Warship. 1710. This model was in Russian possession. The coverings of the port-holes bear the Russian Eagle in gold on red on the inside. According to tradition, this is a work of Peter the Great's. According to other statements, this was executed as a toy for Paul the First. It is evidently a model of the first decades of the 18th century as the style of decoration indicates (Plate 43) and may perhaps have been in the possession of Peter the Great, who got it from a foreign country. It seems to be a Dutch model despite that the style of the escutcheon might indicate relationship with the "Mordaunt" (K. Chatterton, Plate 39) or "Triton" (K. Chatterton, Platte 55). A cavalier is sitting on a chair in the cabin. This latter is furnished with clock, table, chairs and mirror. (Überall, Illustrierte Zeitschrift für Heer und Marine, 1916, p. 281. Chr. Voigt.)

44/45. English Ship "Royal George". 1715. This model is exceptionally well preserved and of excellent construction. In 1744 it was presented by the Prince of Wales to the University of Göttingen and was brought to Hannover. (Chr. Voigt, Schiffsaesthetik, p. 123, fig. 99 and 100. M. Nance, Sailing-Ship Models pl. 67/68.)

46/47. Russian Man-of-War, about 1725. The Russian coat-of-arms which is to be seen on the escutcheon indicates Russian origin. Probably it is the model of the Three-Decker "Peter I and II", built in 1723—1725 in the Admiralty Shipyards of St. Petersburg. It was the first ship of this size the keel of which was laid in a Russian shipyard. The rigging has been renewed in datails. The bowsprit appeard originally to be provided with a sprit mast.

48. English Three-Decker, about 1710 (120 cannon). A present of William III to Peter the Great.

49. Russian Frigate, about 1700. This model is of interest because of the fact that it is the personal workmanship of Peter the Great. He executed it after his return from his first trip abroad. (1698).

50a. Russian Yacht "Prinz Alexander" 1716. 24 cannon. Apart from a cannon-boat of 14 cannon, built in 1787, there has never been a "Prince Alexander" in the Russian Navy. The model makes the entire impression of being English work and Peter the Great probably got it from England. (Robinson and Anderson, The Mariners Mirror, IV, p. 69.)

50b. Turkish Man-of-War of 18th century.

51a. Dutch Yacht, about 1700. The model was in the possession of a certain Pharvason, a navigator, of whom Peter the Great made the acquaintance in London and whom he took with him to Russia. Here Pharvason established a naval school and taught navigation.

51b. Russian Frigate, about 1720.

52a. Russian Ship of the Line "Ingermanland". 1715. Flagship of Peter the Great who in 1716, as Vice-Admiral, "Peter Michaelow" commanded the combined English, Dutch, Danish and Russian fleets.

52b. Swedish Frigate "Venus", about 1790. The frigate was captured in 1789 outside of Christiansfiord by Capt. Ltn. Krona in command of the Russian brig "Merkur". The model was executed thereupon in the Admiralty at St. Petersburg.

53. English Yacht "Transport Royal" 1697. This yacht was given by King William III to Peter the Great as a present at the time of his visit to England.

54. Venetian "Chebecke", about 1720.

55. Dutch Galley 1725. This model was executed for Peter the Great but completed only shortly after his death and thereupon remained in Holland. (See the remarks to plate 39/40).

56a. Maltese Galley 1720. This model was brought by Capt. Lt. Norden to Denmark during the reign of Christian VI, and was used as a model for the construction of galleys.

56b. Danish Galley "Jaegersborg". 1745. Constructed according to the model of the Maltese galley for experiments (B. W. Jordening, Histor. Modelsamling paa Orlogsvaerftet, p. 54.)

57. Tunisian "Chebecke Makarij" was taken from the French in 1799 by Captain Alexiano in command of the Russian frigate "Bogojawlenie Gosspodne".

58a. Russian Galley "Kasatka". 1741. There has never been a galley of this name in the Russian fleet.

58b. Venetian Galley, about 1700.

59. Dutch Yacht, about 1740.

60. Dutch "Boyer" 1750. (van Kampen, Buiten 1925, p. 222.)

61. Dutch Admiralty Yacht. 1750. (M. Nance, Sailing-Ship Models, pl. 89.)

62. Dutch Small Fishing Smack. 1760.

63. Dutch Yacht, about 1760.

64a. Dutch Admiralty Yacht of 8 cannon.

64b. Danish Fireship. (B. W. Jordening, Katalog over den histor. Modelsamling paa Orlogsvaerftet, p. 64.)

65. Dutch "Barge" 1770.

66a. Russian Row-Boat 1780. Catherine II crossed the Wolhow in this, a Russian nobleman sitting at each oar.

66b. Swedish Brig "Bernardus", 24 oars. As this was captured in 1719 by the Russians the model can only have been executed after this date.

66c. Dutch "Boyer" 1697. This model was brought from Holland by Peter the Great.

67a. Russian Frigate, about 1750.

67b/c. Russian Yacht "Prinzess Anna", 1719, built at St. Petersburg according to Dutch type.

68a. Danish Frigate "Samsö", 1746. (B. W. Jordening, Katalog over den histor. Modelsamling, p. 54.)

68b. Dutch Man-of-War, about 1752.

69a. Dutch Frigate, about 1750. Built according the plans of the Englishman C. Benton, who was engaged in the shipyards of the Admiralty at Amsterdam during the years 1736—1758.

69b. Dutch Frigate "Eendracht", 24 cannon, constructed in 1769 at Harlingen.

70a. English Man-of-War, about 1750, 40 cannon.

70b. Dutch Flagship "Vryheid", 1782. The admiral's ship in the battle of Camperdown on October 11, 1797.

71. Russian Frigate „Kreuzer", about 1723.

72a. Dutch Merchantman, about 1810.

72b. Dutch Yacht, about 1730. This, it is true, diverges from the Dutch type, but is nevertheless closely related to the sketches of yachts.

73. Dutch East-India Ship "Mercurius". 1747. (K. Chatterton, Ship Models, pl. 96. See the closely related model M. Nance, Sailing-Ship Models, pl. 80.)

74. Swedish Two-Decker, about 1750. This very large model (the length of the hull is considerably more than 10 feet) was found by the Russians at the capture of Sveaborg in 1808 and was taken along as spoils of war.

75a. Venetian Two-Decker, about 1750.

75b. English Two-Decker of 54 cannon. A present of William III. to Peter the Great. (Robinson and Anderson, The Mariners Mirror, IV, p. 69.)

76a. "Dronning Juliane Maria". This ship of 70 cannon was launched in 1752 at Copenhagen. It was constructed by Barbi. The model, which is exceptionally well executed, was made in 1765 by David Staehr and Johann Knudsen Trane. The decorations, which had been originally modeled in wax, were added in 1815 by the son of the latter, Henrik Knudsen Trane. Among the hundreds of models which have passed through my hand this is one of the best and finest. (Jordening, p. 58 sq.)

76b. Dutch Two-Decker, about 1750.

77. Hamburg Frigate "Phoenix", 1750.

78. Dutch Frigate "De Juffrou Elisabeth", 1775.

79. Hanseatic Ship, about 1760.

80. Hamburg Convoyship 1775.

81. Danzig Convoyship of about 1775. The coat-of-arms of Danzig is on the broad escutcheon.

82. Danzig Merchantman, about 1775. The coat-of-arms of Danzig supported by two lions is on the escutcheon. See Pl. 13b.

83. Danish Man-of-War, about 1780. Here again the escutcheon shows the broad form which was preferred in the shipyards of the cities of the Baltic Sea. Compare Pl. 84.

84. Man-of-War „Der Friede", about 1780.

85. Russian Frigate, about 1870. Ships of this sort, all of the same size and armed with 74 cannon were built in great number under the reign of Catherine II.

86. Russian Frigate, about 1775. Probably the "Hector" which was constructed in 1774—1781.

87a. Danish "Bomb-Vessel", 1771. (B.W. Jordening, Den histor. Modelsamling, p. 66.)

87b. Danish Two-Decker "Den Praegtige", 1768. (B. W. Jordening, Den histor. Modelsamling paa Orlogsvaerftet, p. 63.)

88. Figure Head of the Danish Man-of-War "Fredericus Quintus", 1753. (B. W. Jordening, Den histor. Modelsamling, p. 101.)

89. Merchantman, about 1775. The model is probably of Russian origin.

90. Russian Frigate, 32 cannon. Ships of this sort were built in great number under the reign of Catherine II in the Royal Shipyard at Archangels.

91. Nelsons "Victory". Model of Ivory. (Laughton, The Mariners Mirror, III, p. 193.)

92. German Ship „Catharina", 1770.

93/94. Russian Two-Decker about 1760. See the stern of the Danish Ship of the Line "Trekroner", pl. X.

95/96. Russian Man-of-War "The Three Hierarchs", 1766. Flagship of the Grand-Admiral Count Alexei Gregorewitch Orlow. In remembrance of the battle of Tschesme Catherine II. gave the order that the name of this ship should a be pepetuated in the Russian Navy.

96b. Russian Sloop, the grandfather of the Russian Navy. Apart from this model the cutter is also preseved and is kept in the Peter Paul's Fort at Leningrad.

97. Russian Yacht "Luck", 12 cannon, built in 1777 at St. Petersburg. As to the flag see The Mariners Mirror, II, p. 120.

98. Swedish Private Yacht "Neptunus". This ship was built in Holland in the second half of the 17th century. It had a speed of 16 knots and was the fastest ship of her time. The model has been reconstructed according to the plans and drawings of Chapman. (M. Nance, pl. 79.)

99a. Russian Man-of-War "The Three Hierarchs". 1783.

99b. Russian Three-Decker "Prince Wladimir" 1788.

100. Russian Man-of-War about 1800. Perhaps this is the "Gabriel" on which work was commenced in 1800 and which was launched in 1802.

101a. Dutch Man-of-War "Admiral von Kinsbergen".

101b. Dutch Merchantman.

102a. Russian Merchantman of about 1850.

102b. Russian Frigate of about 1810 with rich ivory decorations. This model was in the possession of the ship constructor Wlasow.

103. Turkish Three-Master, about 1750. This was captured near Rhodos by the Russian Frigate "Saint Paul" under the command of Captain Alexiano. The ship carried, naturally, lateen sails on all masts. The yards are lacking on the model. (The Mariners Mirror, III, p. 156, fig. 2.)

104. Chinese Junk, about 1800. Chinese work, details executed with great care.

105. Hamburg Full-rigged Ship, about 1800. The model is constructed of bones.

106. Danish Corvette 1810. (M. Nance, Sailing-Ship Models, pl. 112.)

107a. Dutch Man-of-War "Koning der Nederlanden". 1842.

107b. Frigate "Augsburg". (Cross-section). According to tradition and the Russian inscription this model is of Russian origin. There has, however, never been a ship of such name in the Russian Navy.

108/109. Russian Brig "Olymp" 1817. A beautiful model constructed of redwood ard ivory. The brig itself, wich was armed with 20 cannon, was demantled at Kronstadt in 1827. It is to be noticed that the stay-sails were cut in the form of a trapezium.

110. Danish Two-Decker "Flora von Gunde", 1830. There has never been a ship of this name. See: The Mariners Mirror, VIII, p. 334.

111. German Full-rigged Ship "Etienne" of about 1880.

112. German Full-rigged Ship "Antilope" of about 1890.

* * *

I. Swedish Man-of-War "Amaranthe". See Plate 7/8.

II. Danish Man-of-War "Norske Löve". This model was constructed in ivory by the Danish armourer Jacob Jensen in 1654. The original ship, the basis of the model, can be placed in the third decade of that century. It is exceptionally fine work and thoroughly reliable as to the sails. The rigging which is made of silver wire has been slightly restored. The main sail bears the monogram of Frederick III (1648—1670). (M. Nance, Sailing Ship-Models, pl. 19.)

III. Hanseatic Ship of war, about 1650. The type corresponds closely to a Dutch ship; in any case more than the craft built at that time in the shipyards of the Baltic Sea. (See Plate 10). The mast and the sails have been renewed in details.

IV. Escutcheon oft the English Three-Decker of Plate 24.

V. Danish Medal, cast in gold and silver in 1677 as souvenir of the naval victories of Niels Juel.

VI/VII. English Three-Decker, 1710. See Plate 48.

VIII. Danish Galley and boats, ivory models, also constructed by the armourer Jacob Jensen (see pl. II).

IX. Venetian Gondola. This model was brought by Frederick IV. of Denmark from Venice in 1708 and a number of gondolas which were used for a long time by the royal family were built in Copenhagen according to it.

X. Danish Man-of-War "Trekroner" 1742. (K. Chatterton, Ship Models, pl. 81).

XI. Hanseatic Convoyship of about 1770. The masts are original but the rigging has been entirely renewed.

XII. Danish Frigate "Rota" 1822. Thorwaldsen was brought home from Italy on the "Rota" in 1838. The ship stranded in 1892 in the English Channel.

PLATES

Hanseatic Convoy 1603
Nürnberg, Germanisches Museum

1

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Man-of-War 1627
Zierikzee (Prov. Zeeland), Townhall

UNIVERSITY OF ARIZONA
LIBRARY

Dutch East-Indiaman "Prins Willem" 1649
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch East-Indiaman "Prins Willem" 1649
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch East-Indiaman "Prins Willem" 1649
Amsterdam, Nederlandsch Scheepvaart Museum

Dutch Admiralty Yacht circa 1660
Holland, Private collection

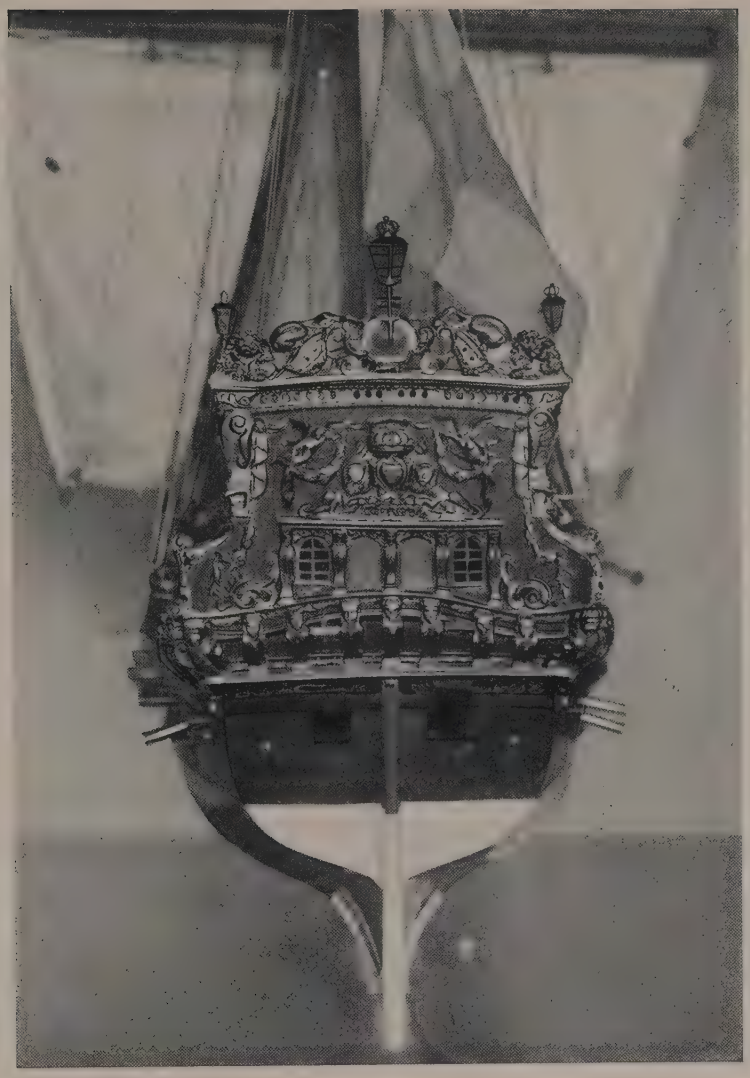
UNIVERSITY OF ARIZONA
LIBRARY

Dutch Admiralty Yacht circa 1660
Holland, Private collection

UNIVERSITY OF ARIZONA
LIBRARY

Swedish Man-of-War "Amaranthe" 1654
Gothenburg, Sjöfahrtsmuseum

UNIVERSITY OF ARIZONA
LIBRARY



Swedish Man-of-War "Amaranthe" 1654
Gothenburg, Sjöfahrtsmuseum

UNIVERSITY OF ARIZONA
LIBRARY

II

Danish Man-of-War "Norske Löve" 1654

Copenhagen, Rosenborg Castle

Two-Decker of Lübeck circa 1650
Lübeck, Haus der Schiffergesellschaft

UNIVERSITY OF ARIZONA
LIBRARY

Two-Decker of Danzig circa 1660
Dresden, Historisches Museum

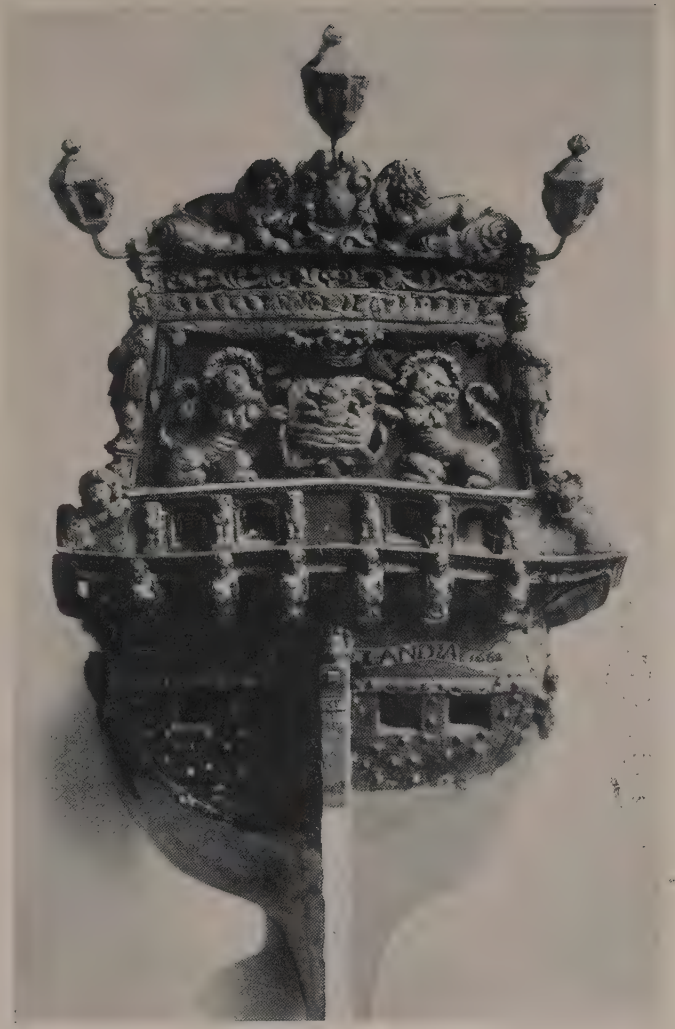
UNIVERSITY OF ARIZONA
LIBRARY

Dutch Flagship "Hollandia" 1665
Amsterdam, Nederlandsch Scheepvaart Museum

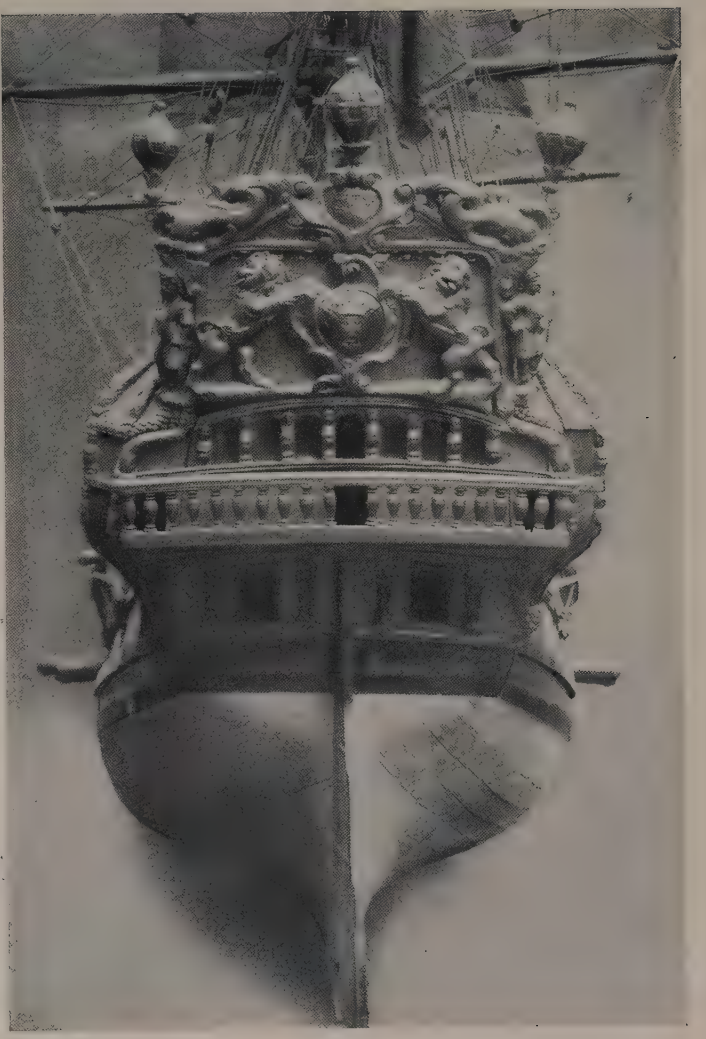
UNIVERSITY OF
LIBRARY

Two-Decker of Danzig circa 1650
Danzig, Artushof

UNIVERSITY OF ARIZONA
LIBRARY



Dutch Flagship "Zeelandia" 1662
Rotterdam, Maritiem Museum



Two-Decker of Danzig circa 1650
Danzig, Artushof

UNIVERSITY OF
LIBRARY

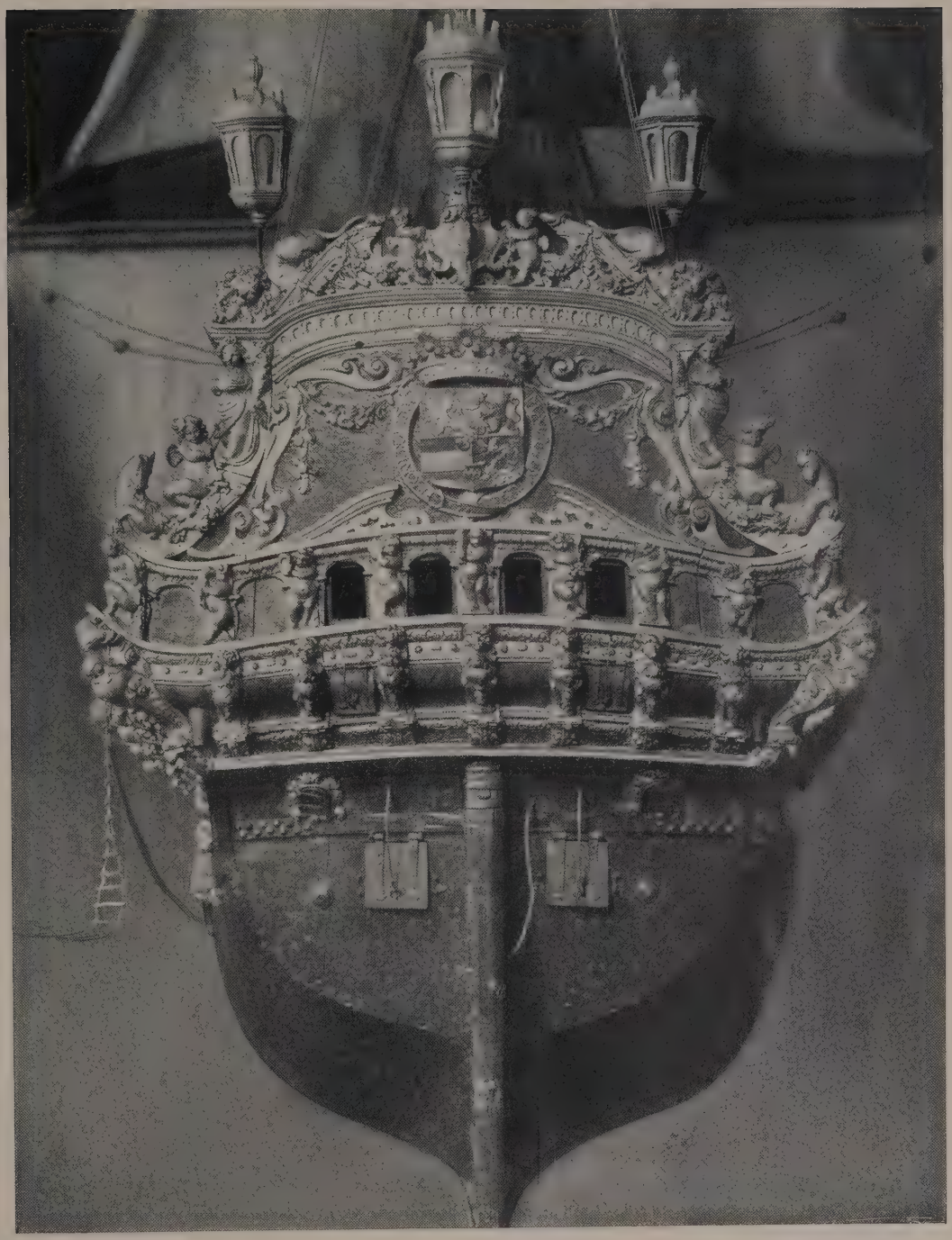
Dutch Flagship "Zeelandia" 1662
Rotterdam, Maritiem Museum "Prins Hendrik"

Dutch Merchantman circa 1630
Rotterdam, Maritiem Museum "Prins Hendrik"

UNIVERSITY OF
LIBRARY

Dutch Flagship circa 1660
Berlin, Hohenzollern-Museum

UNIVERSITY OF ARIZONA
LIBRARY



Dutch Flagship circa 1660
Berlin, Hohenzollern-Museum

UNIVERSITY OF ARIZONA
LIBRARY

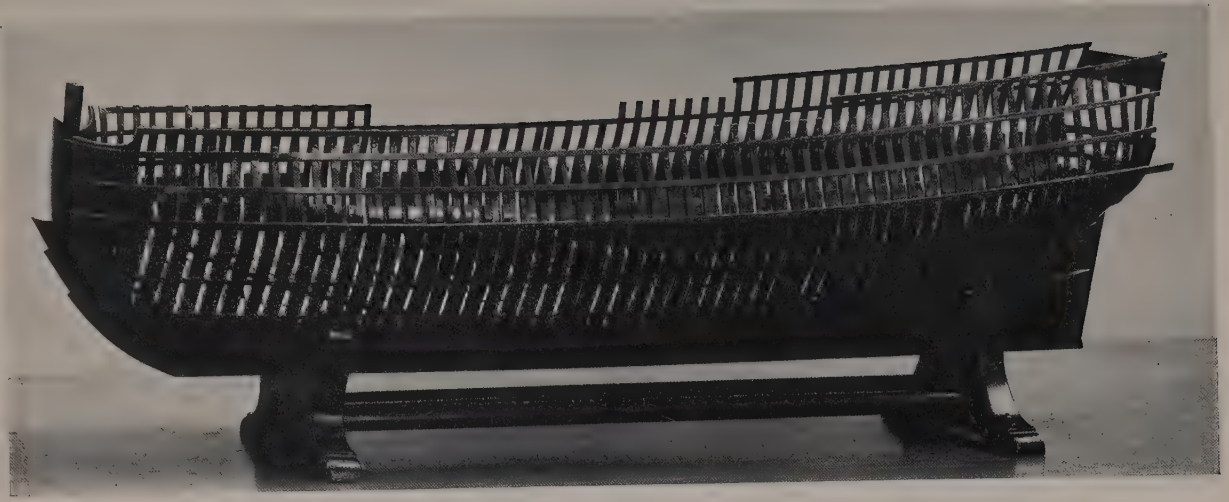
III

Hanseatic Man-of-War circa 1650

Berlin, Institut für Meereskunde

Hanseatic Man-of-War circa 1650
Berlin, Institut für Meereskunde

UNIVERSITY
LIBRARY



Danish Frigate "Blaa Hejren" 1734
Copenhagen, Admiralty

Danish Royal Yacht 1695
Copenhagen, Admiralty

UNIVERSITY OF ARIZONA
LIBRARY

Danish Royal Yacht 1695
Copenhagen, Admiralty

UNIVERSITY OF
LIBRARY

Lübeck Two-Decker "Die Hoffnung" 1686
Lübeck, St.-Annen-Museum

UNIVERSITY OF ARIZONA
LIBRARY

Danish Two-Decker "Prins Carl" 1696
Copenhagen, Admiralty

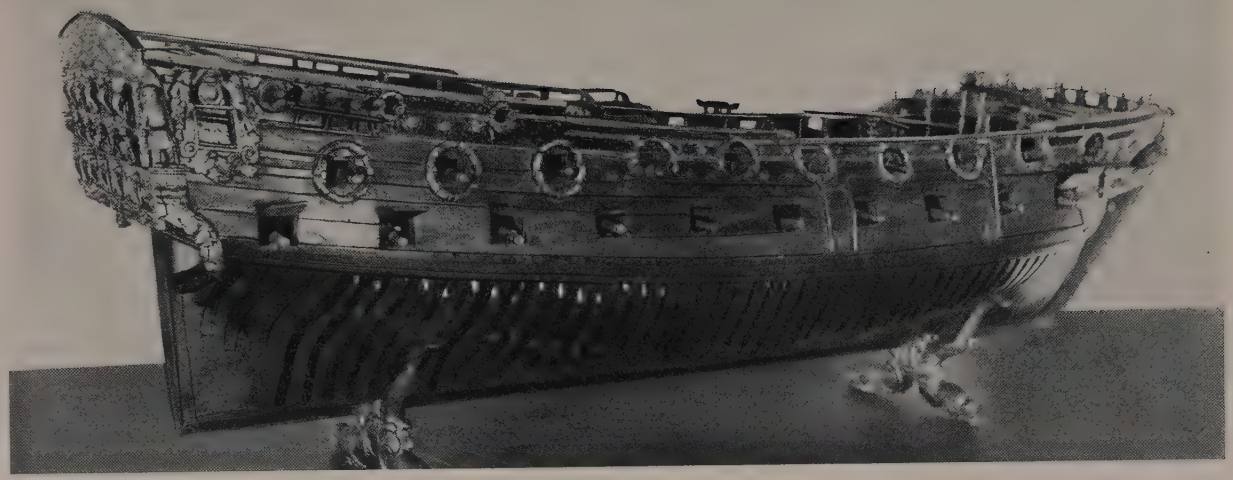
UNIVERSITY OF ARIZONA
LIBRARY

English Yacht ("Folly") circa 1680
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Admiralty Yacht 17. Century
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY



English Two-Decker circa 1690
Leningrad, Marine Museum

English Three-Decker circa 1690
Leningrad, Marine Museum

UNIVERSITY OF
LIBRARY

IV

English Three-Decker circa 1690

Leningrad, Marine Museum

LIBRARY

Danish Two-Decker 1680
Copenhagen, Admiralty

UNIVERSITY OF ARIZONA
LIBRARY

English Two-Decker 1684
Wien, Technisches Museum

UNIVERSITY OF ARIZONA
LIBRARY

Hanseatic Three-Decker 17. Century
Lübeck, Haus der Schiffergesellschaft

UNIVERSITY OF ALBERTA
LIBRARY

Dutch Flight circa 1640
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ALBERTA
LIBRARY

Lübeck Flight circa 1700
Lübeck, Haus der Schiffergesellschaft

UNIVERSITY OF ARIZONA
LIBRARY

Lübeck Flight "Der Löwe" 1690
Lübeck, St.-Annen-Museum

UNIVERSITY OF
LIBRARY

Lübeck Flight "De jonge Johann" 1712
Church of Schlutup

UNIVERSITY OF ARIZONA
LIBRARY

Swedish Man-of-War circa 1700
Gothenburg, Sjöfartsmuseum

UNIVERSITY OF ARIZONA
LIBRARY

V

Danish Medal 1677
Berlin, Münzcabinet

LIBRARY

Convoy-Ship of Hamburg circa 1700
Hamburg, Museum für Hamburg. Geschichte

UNIVERSITY OF ALBERTA
LIBRARY

Lübeck Flight circa 1720
Lübeck, Haus der Schiffergesellschaft

UNIVERSITY OF ARIZONA
LIBRARY

Hanseatic Flight circa 1730
Berlin, Museum für Kunstgewerbe

UNIVERSITY OF ARIZONA
LIBRARY

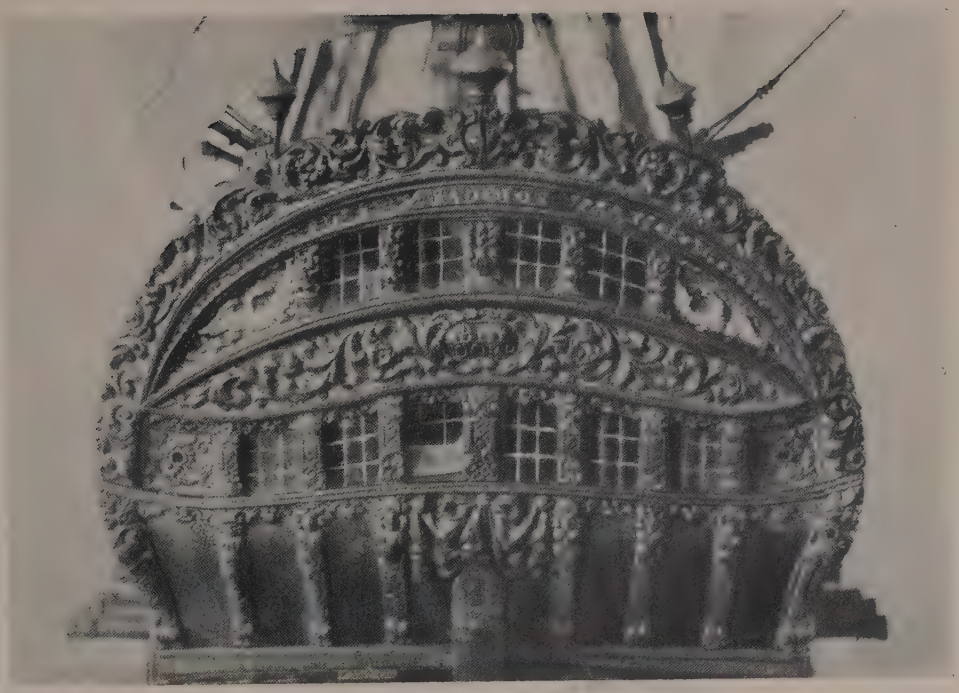
Dutch East-Indiaman circa 1710
Berlin, Institut für Meereskunde

UNIVERSITY OF ARIZONA
LIBRARY

Dutch East-Indiaman "Padmos" 1723
Rotterdam, Maritiem Museum "Prins Hendrik"

Dutch Two-Decker "Princes Carolina" 1747
Rotterdam, Maritiem Museum "Prins Hendrik"

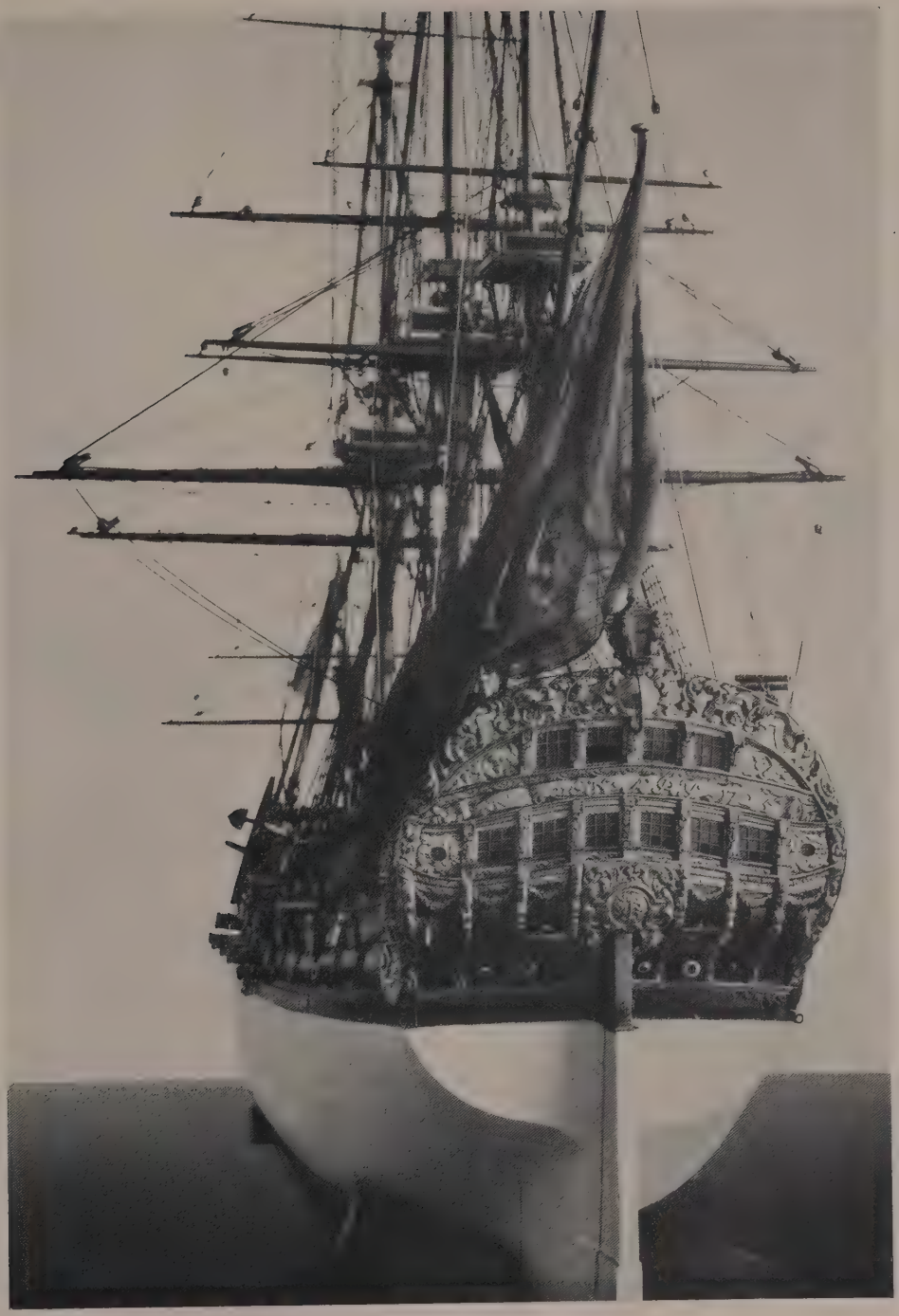
UNIVERSITY OF ALBERTA
LIBRARY



Dutch East-Indiaman "Padmos" 1723
Rotterdam, Maritiem Museum "Prins Hendrik"

Man-of-War circa 1710
Rotterdam, Maritiem Museum "Prins Hendrik"

UNIVERSITY OF ARIZONA
LIBRARY



Dutch East-Indiaman "Den Ary" 1725
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch East-Indiaman "Den Ary" 1725
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

VI

English Three-Decker circa 1710

Leningrad, Marine Museum

LIBRARY

Dutch Two-Decker circa 1720
Berlin, Institut für Meereskunde

UNIVERSITY OF ARIZONA
LIBRARY

Man-of-War circa 1710
Weimar, Schloßmuseum

UNIVERSITY OF ALBERTA
LIBRARY

Man-of-War circa 1710
Weimar, Schloßmuseum

UNIVERSITY OF ARIZONA
LIBRARY

English Ship "Royal George" 1715
Hannover, Technische Hochschule

UNIVERSITY OF ARIZONA
LIBRARY

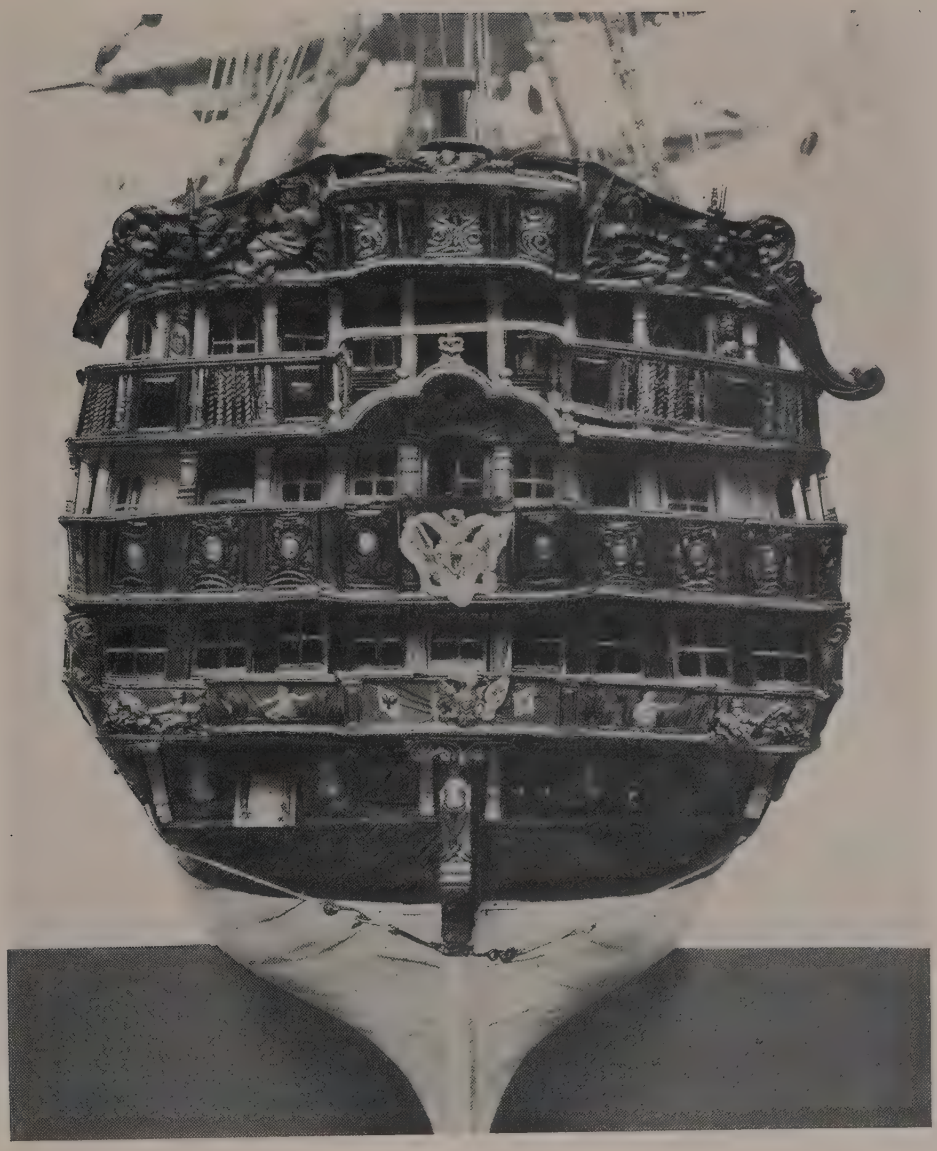
English Ship "Royal George" 1715
Hannover, Technische Hochschule

UNIVERSITY OF ARIZONA
LIBRARY

Russian Man-of-War circa 1725

In the possession of H. R. H. the Grandduke of Oldenburg

LIBRARY



Russian Man-of-War circa 1725

In the possession of H. R. H. the Grandduke of Oldenburg

UNIVERSITY OF ARIZONA
LIBRARY

English Three-Decker circa 1710

Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

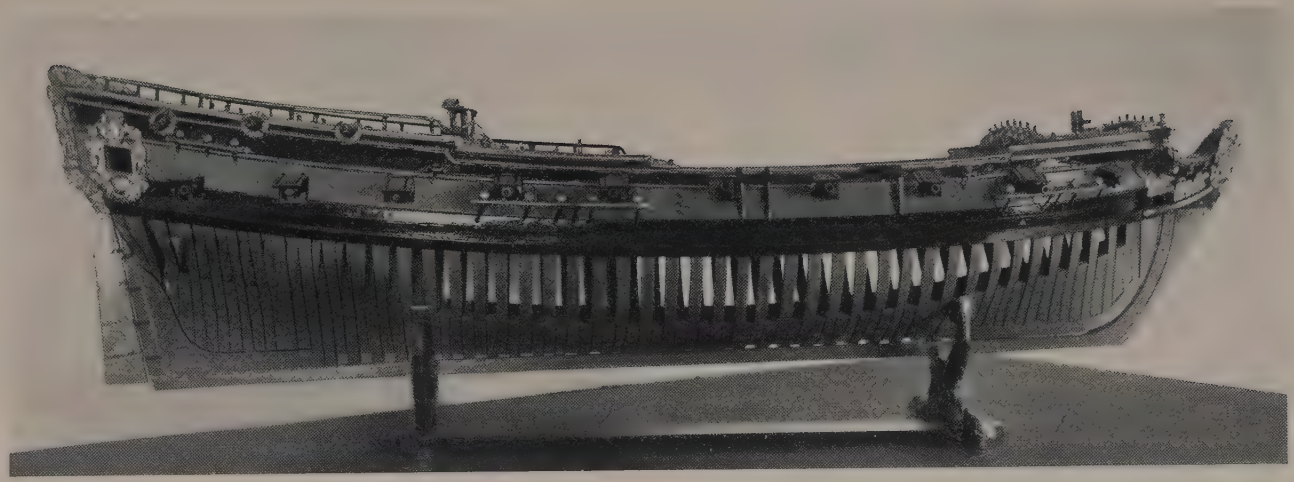
VII

English Three-Decker circa 1710

Leningrad, Marine Museum

Russian Frigate circa 1700
(Work of Peter the Great)
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

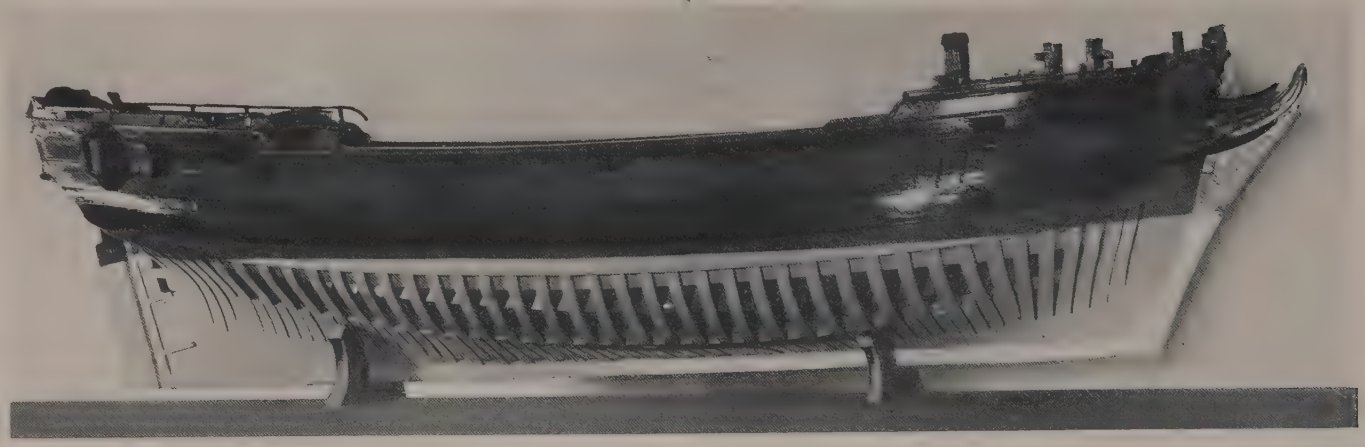


Russian Yacht "Prince Alexander" 1716
Leningrad, Marine Museum

Turkish Man-of-War 18. Century
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Yacht circa 1700
Leningrad, Marine Museum



Russian Frigate circa 1720
Leningrad, Marine Museum

LIBRARY

Russian Man-of-War "Ingermanland" 1715
Leningrad, Marine Museum

Swedisch Frigate "Venus" circa 1790
Leningrad, Marine Museum

UNIVERSITY OF
LIBRARY

English Yacht "Transport Royal" 1697
Leningrad, Marine Museum

LIBRARY

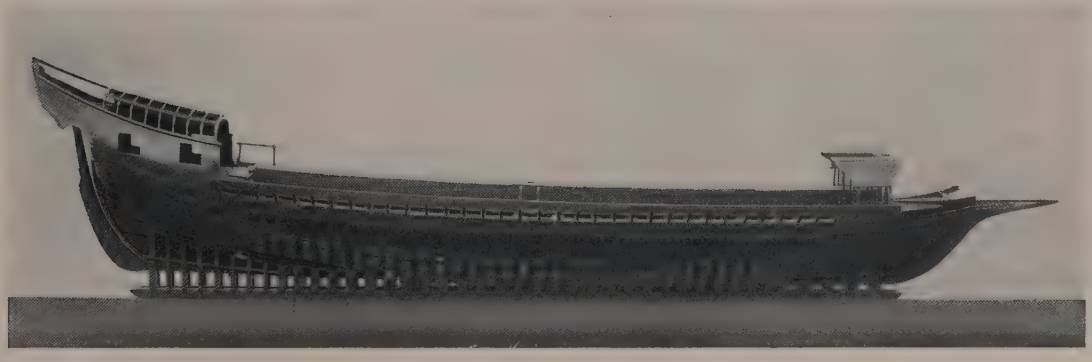
Venetian Chebec 1720
Copenhagen, Admiralty

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Galley 1725
Amsterdam, Rijksmuseum

UNIVERSITY OF ARIZONA
LIBRARY

Galley of Malta circa 1720
Copenhagen, Admiralty



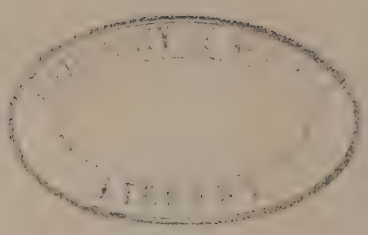
Danish Galley "Jaegersborg" 1745
Copenhagen, Admiralty

UNIVERSITY OF ARIZONA
LIBRARY

VIII

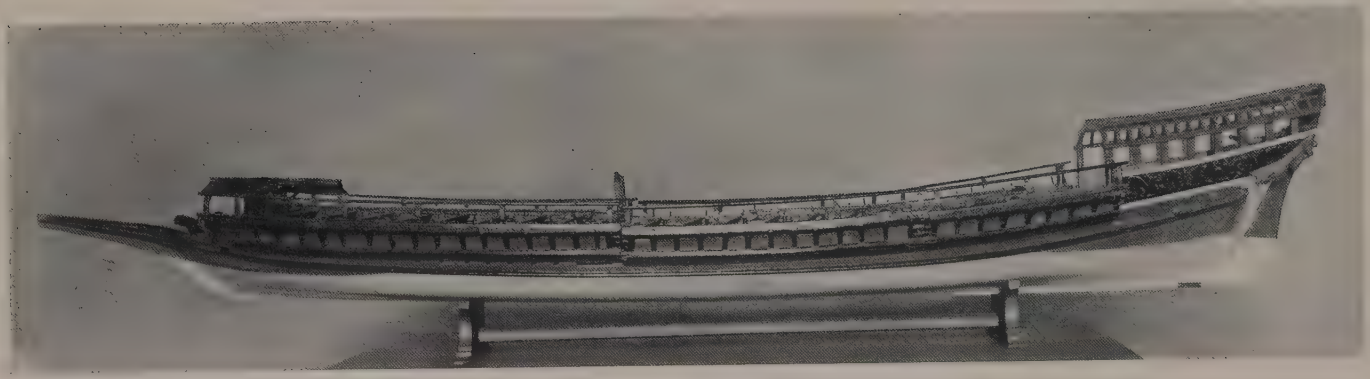
Danish Models of Ivory circa 1650

Copenhagen, Rosenborg Castle

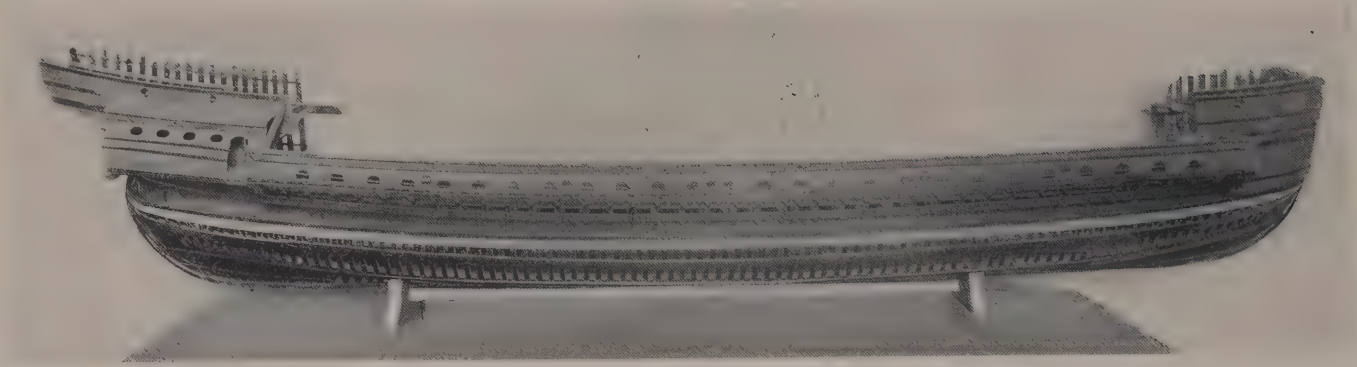


Tunisian Chebec "Makarij" circa 1790
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY



Russian Galley "Kasatka" 1774
Leningrad, Marine Museum



Venetian Galley circa 1700
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Yacht 1740
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Boeier 1750
Amsterdam, Rijksmuseum

UNIVERSITY OF ARIZONA
LIBRARY

Dutch Admiralty Yacht circa 1750
Amsterdam, Nederlandsch Scheepvaart Museum

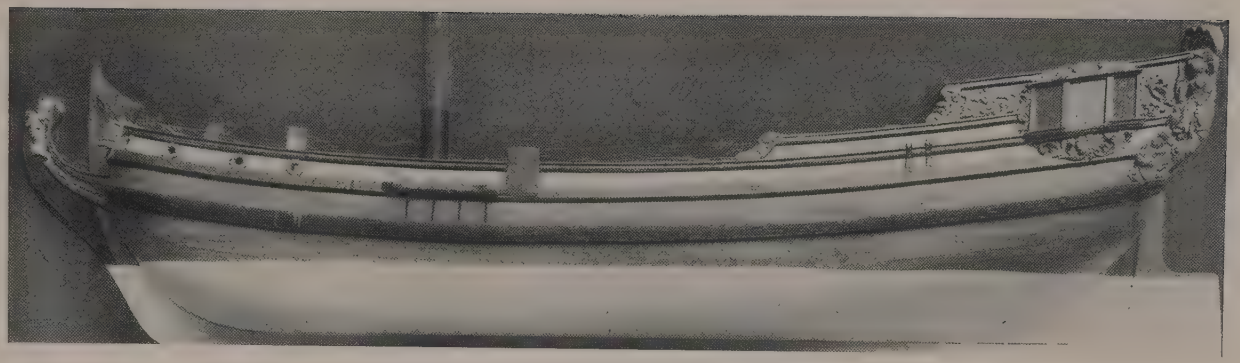
UNIVERSITY OF ARIZONA
LIBRARY

Dutch Herring Buss circa 1760
Amsterdam, Nederlandsch Scheepvaart Museum

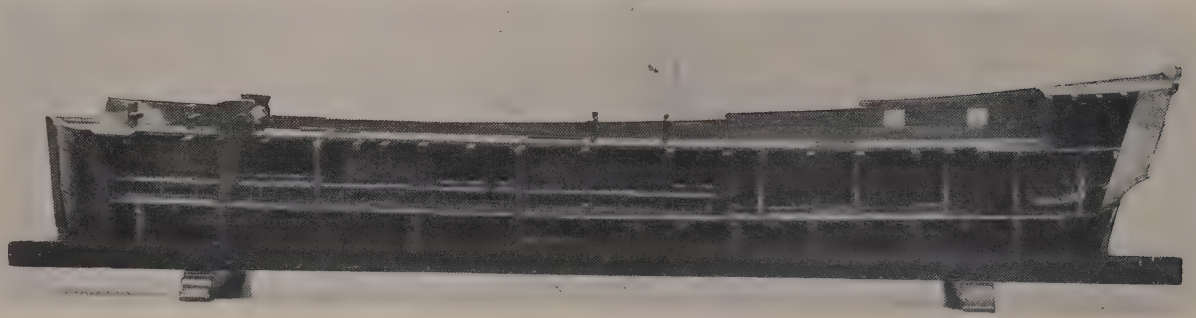
UNIVERSITY OF
LIBRARY

Dutch Kopyacht circa 1760
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY



Dutch Admiralty Yacht circa 1730
Amsterdam, Rijksmuseum



Danish Fire-Ship 1767
Copenhagen, Admiralty

UNIVERSITY OF
LIBRARY

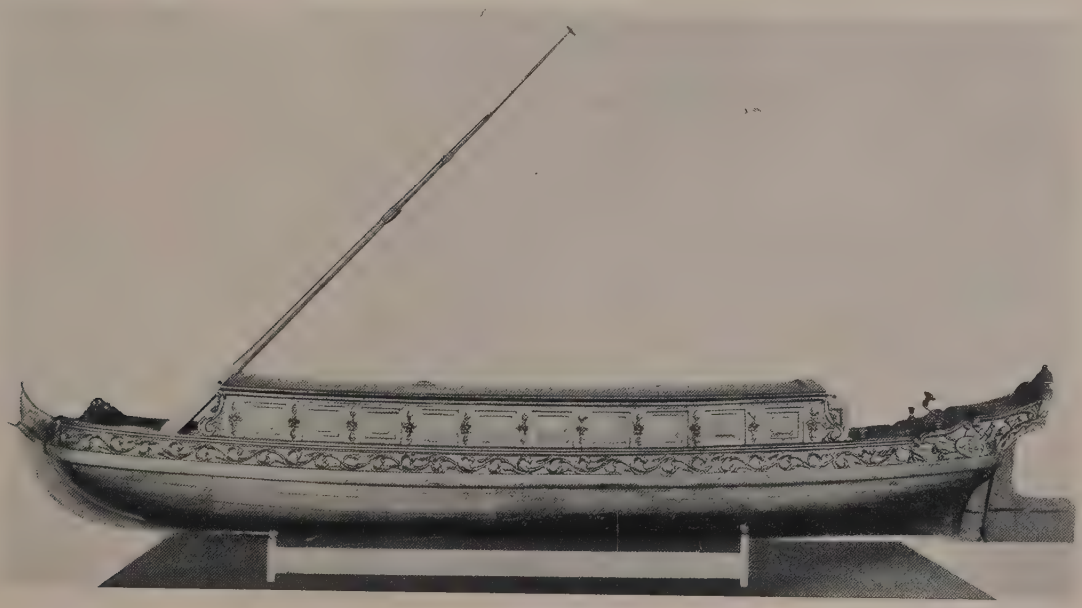
IX

Venetian Gondola circa 1700

Copenhagen, Admiralty

LIBRARY

Dutch Barge 1770
Rotterdam, Maritiem Museum "Priñs Hendrik"



Dutch Barge 1770
Rotterdam, Maritiem Museum "Prins Hendrik"

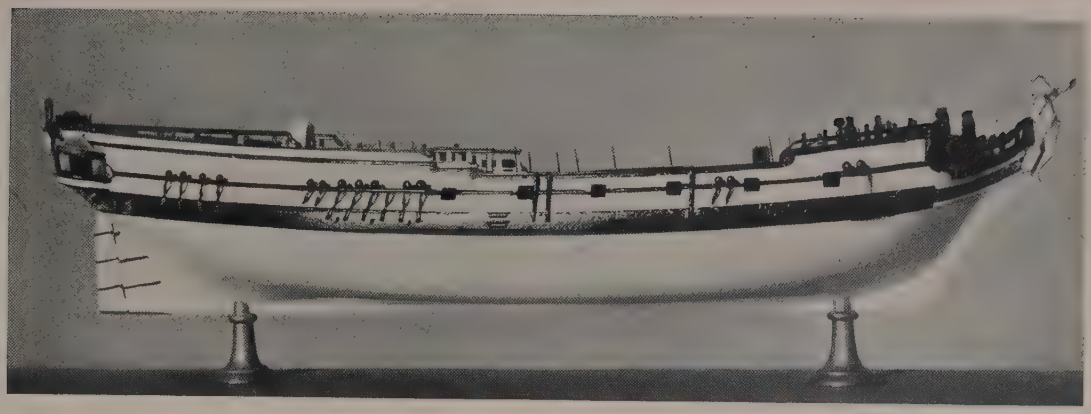
UNIVERSITY OF ARIZONA
LIBRARY

Russian Barge circa 1780
Leningrad, Marine Museum

Swedish Brigantine "Bernardus" circa 1750
Leningrad, Marine Museum

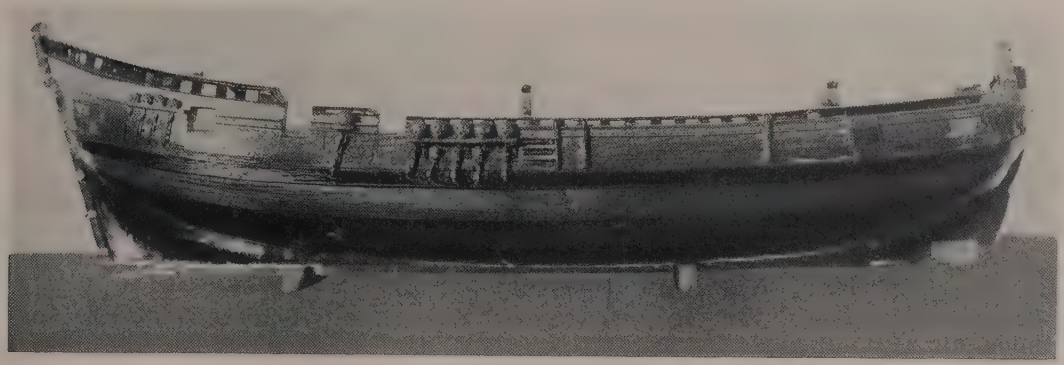
Dutch Boeier 1697
Leningrad, Marine Museum

UNIVERSITY OF
LIBRARY



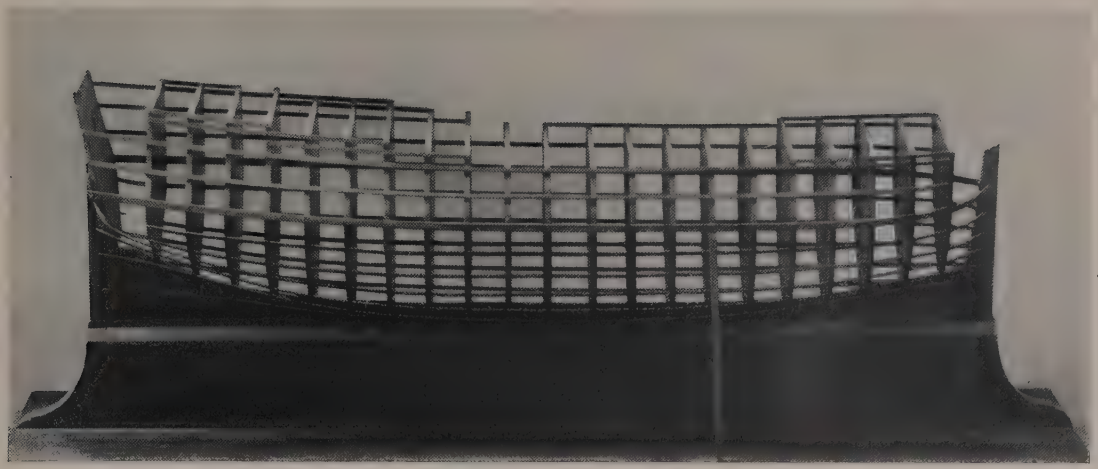
Russian Frigate circa 1750
Leningrad, Marine Museum

Russian Yacht "Princess Anna" 1719



Russian Yacht "Princess Anna" 1719
Leningrad, Marine Museum

LIBRARY



Danish Frigate "Samsö" 1746
Copenhagen, Admiralty

Dutch Man-of-War 1752
Amsterdam, Nederlandsch Scheepvaart Museum

LIBRARY

Dutch Frigate circa 1750
Amsterdam, Rijksmuseum

Dutch Corvette "Eendracht" 1769
Amsterdam, Rijksmuseum

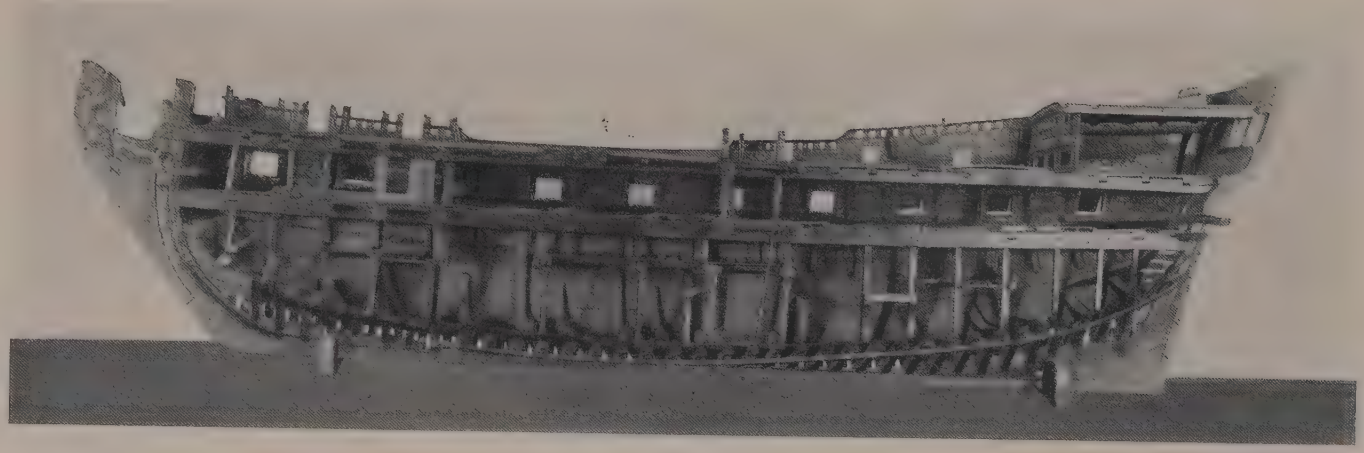
UNIVERSITY OF ARIZONA
LIBRARY

English Man-of-War circa 1750
Amsterdam, Rijksmuseum

Dutch Flagship "Vryheid" 1782
Amsterdam, Rijksmuseum

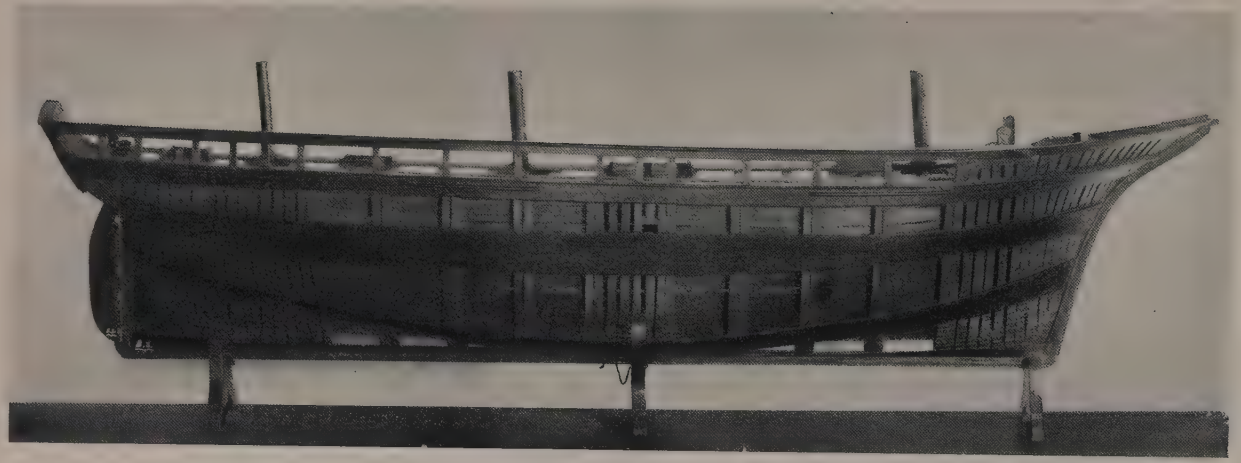
UNIVERSITY OF ARIZONA
LIBRARY

Russian Frigate "Cruiser" 1723

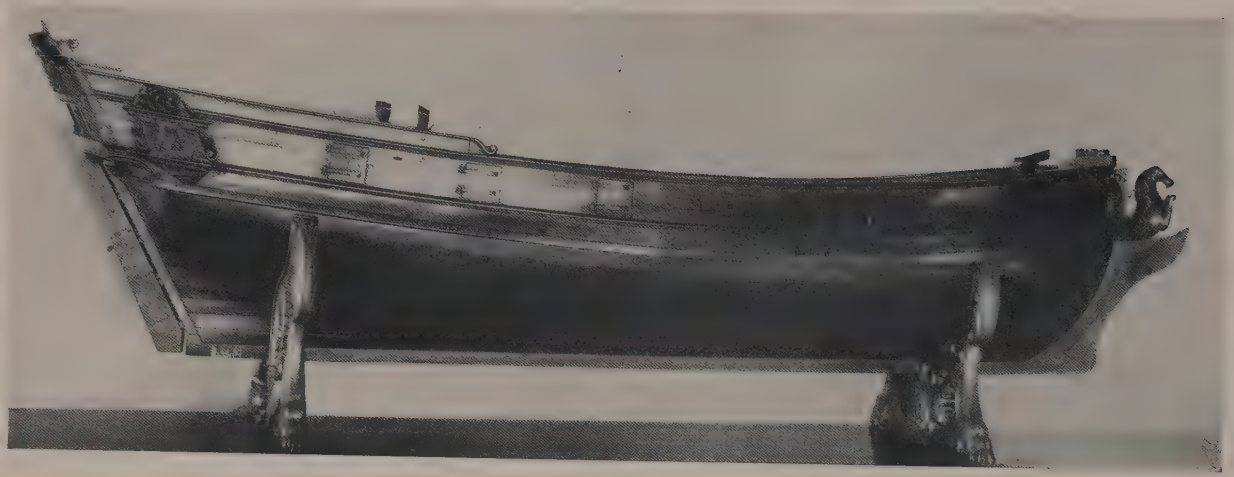


Russian Frigate "Cruiser" 1723
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY



Dutch Merchantman circa 1810
Amsterdam, Nederlandsch Scheepvaart Museum



Dutch Yacht circa 1730
Amsterdam, Nederlandsch Scheepvaart Museum

UNIVERSITY OF ARIZONA
LIBRARY

X

Danish Man-of-War "Trekroner" 1742

Copenhagen, Admiralty

Dutch East-Indiaman "Mercurius" 1747
Amsterdam, Rijksmuseum

UNIVERSITY OF
LIBRARY

Swedish Two-Decker circa 1750
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Venetian Two-Decker circa 1750
Venice, Marine Museum

English Two-Decker circa 1700
Leningrad, Marine Museum

UNIVERSITY OF ALBERTA
LIBRARY

Danish Man-of-War "Dronning Juliane Maria" 1765

Copenhagen, Admiralty

Dutch Two-Decker circa 1750

Amsterdam, Rijksmuseum

LIBRARY

Hamburg Frigate "Phoenix" 1750
Hamburg, Museum für Hamburgische Geschichte

UNIVERSITY OF [illegible]
LIBRARY

Dutch Frigate "De Juffrou Elisabeth" 1757
Hamburg, Museum für Hamburgische Geschichte

UNIVERSITY OF GEORGIA
LIBRARY

Hanseatic Ship circa 1760
Danzig, Artushof

LIBRARY

Convoyship of Hamburg circa 1775
Hamburg, Museum für Hamburgische Geschichte

UNIVERSITY OF ARIZONA
LIBRARY

XI

Hanseatic Convoy circa 1770

Hamburg, Museum für Hamburgische Geschichte

Convoyship of Danzig circa 1775
Danzig, Artushof

81

UNIVERSITY OF
LIBRARY

Danzig Merchantman circa 1775
Danzig, Artushof

LIBRARY

Danish Man-of-War circa 1780
Berlin, Institut für Meereskunde

UNIVERSITY OF ARIZONA
LIBRARY

Man-of-War "Der Friede" circa 1780
Berlin, Institut für Meereskunde

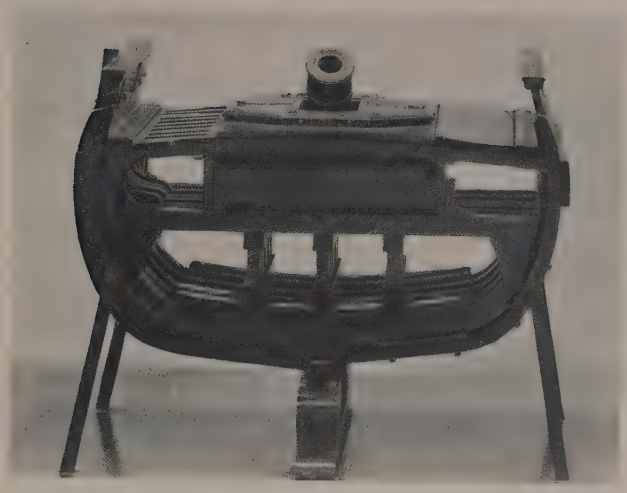
UNIVERSITY OF ARIZONA
LIBRARY

Russian Frigate circa 1780
Leningrad, Marine Museum

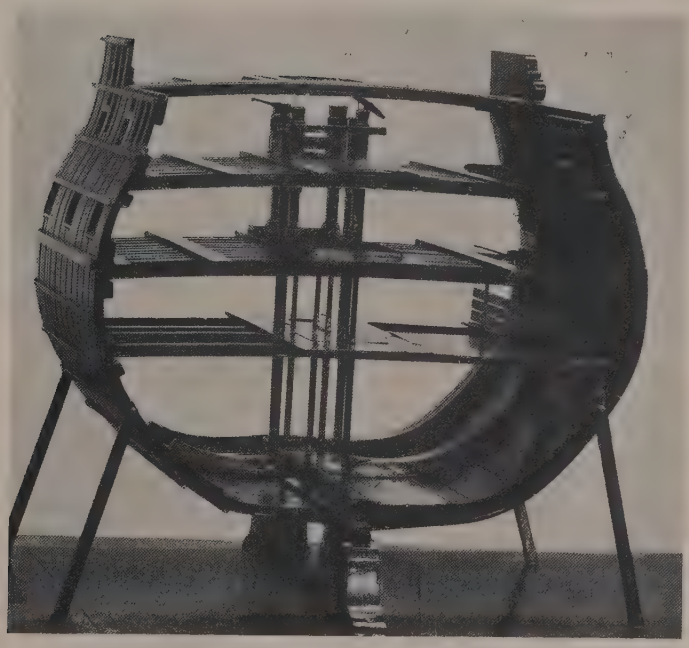
UNIVERSITY OF
LIBRARY

Russian Frigate 1775
Leningrad, Marine Museum

UNIVERSITY OF
LIBRARY

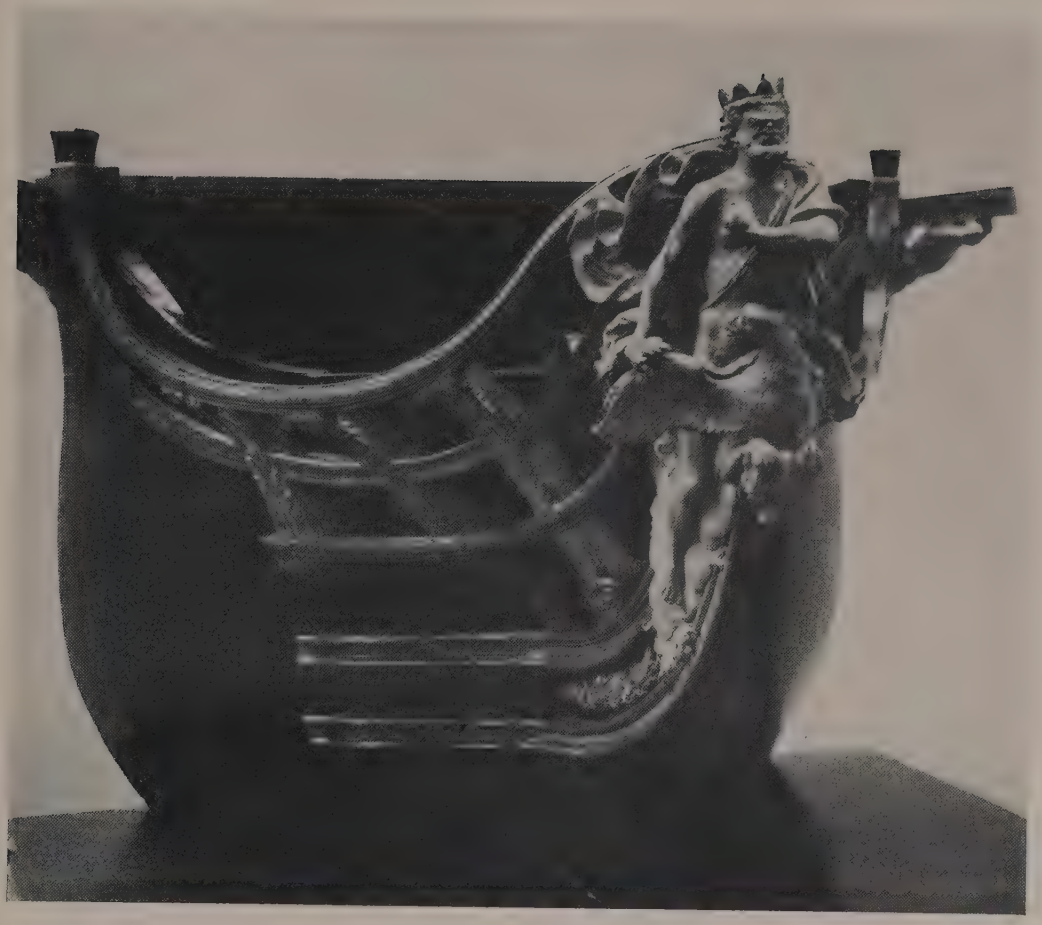


Danish Bomb-Vessel 1771
(Midship Section)
Copenhagen, Admiralty



Danish Two-Decker "Den Praegtige" 1768
(Midship Section)
Copenhagen, Admiralty

UNIVERSITY OF ALBERTA
LIBRARY



Danish Man-of-War "Fredericus Quintus" 1753
(Figure-head)
Copenhagen, Admiralty

UNIVERSITY OF ARIZONA
LIBRARY

Merchantman circa 1775

In the possession of H. R. H. the Grandduke of Oldenburg

UNIVERSITY OF ALBERTA
LIBRARY

Russian Frigate 1775
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Nelsons "Victory" (Model of Ivory)
Berlin, Hohenzollernmuseum

UNIVERSITY OF ARIZONA
LIBRARY

German Ship "Catharina" 1770
Hamburg, Museum für Hamburgische Geschichte

UNIVERSITY OF ARIZONA
LIBRARY

Russian Two-Decker circa 1760
In the possession of H. R. H. the Grandduke of Oldenburg

UNIVERSITY OF ARIZONA
LIBRARY

Russian Two-Decker circa 1760
In the possession of H. R. H. the Grandduke of Oldenburg

UNIVERSITY OF ARIZONA
LIBRARY

Russian Man-of-War "The Three Hierarchs" 1766
Leningrad, Marine Museum

LIBRARY

Russian Man-of-War "The Three Hierarchs" 1766
Leningrad, Marine Museum

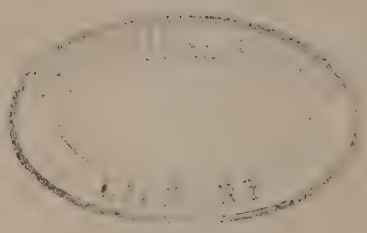
Russian Sloop, the grandfather of the Russian Navy
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

XII

Danish Frigate "Rota" 1822

Copenhagen, Admiralty



Russian Yacht "Luck" 1777
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Swedish Privateer "Neptunus"
Gothenburg, Sjöfartsmuseum

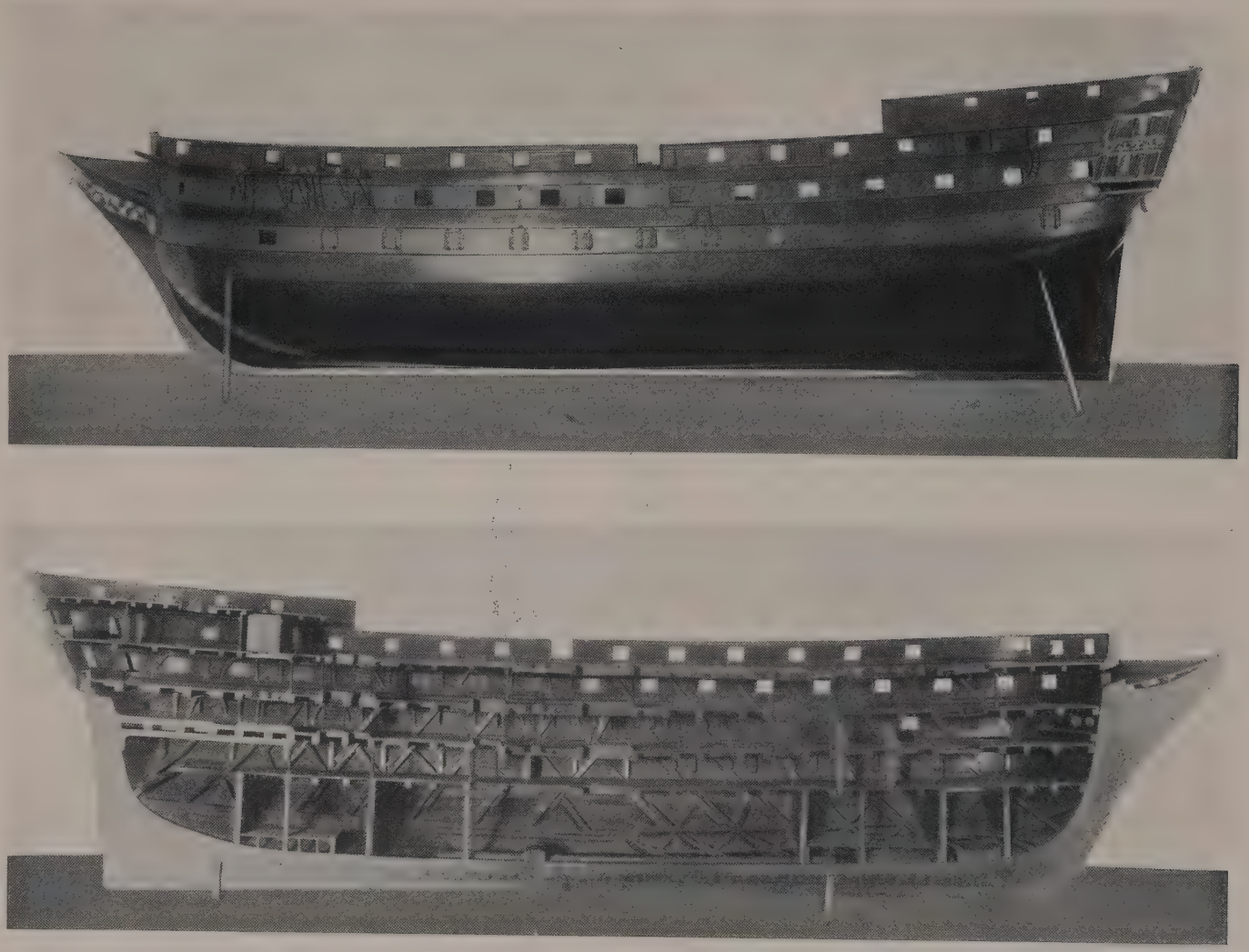
LIBRARY

Russian Man-of-War "The Three Hierarchs" 1783
Leningrad, Marine Museum

Russian Three-Decker "Prince Wladimir" circa 1780
Leningrad, Marine Museum

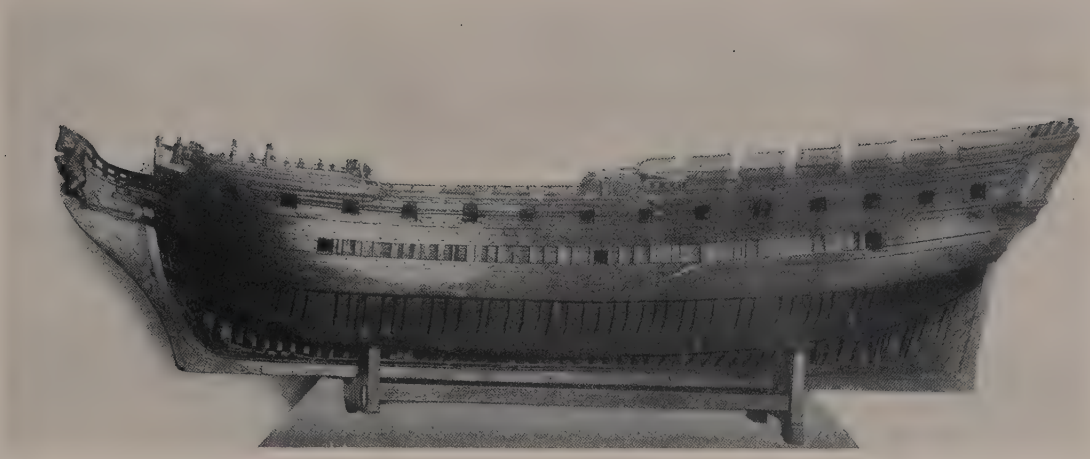
115983

UNIVERSITY OF ATHENS
LIBRARY

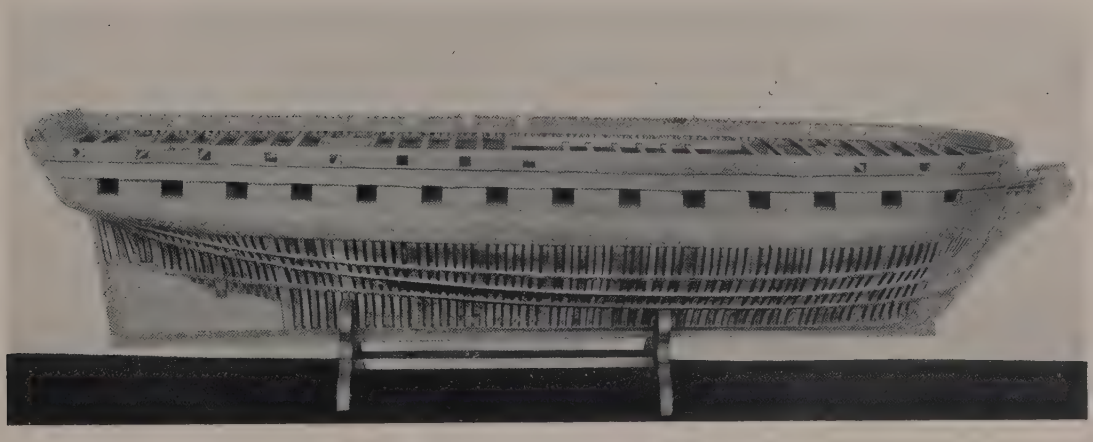


Russian Man-of-War circa 1800
Leningrad, Marine Museum

LIBRARY



Dutch Man-of-War "Admiral van Kinsbergen"
Amsterdam, Nederlandsch Scheepvaart Museum



Dutch Merchantman 1870
Rotterdam, Maritiem Museum "Prins Hendrik"

UNIVERSITY OF ARIZONA
LIBRARY

Russian Merchantman circa 1850
Leningrad, Marine Museum

Russian Frigate circa 1810
Leningrad, Marine Museum

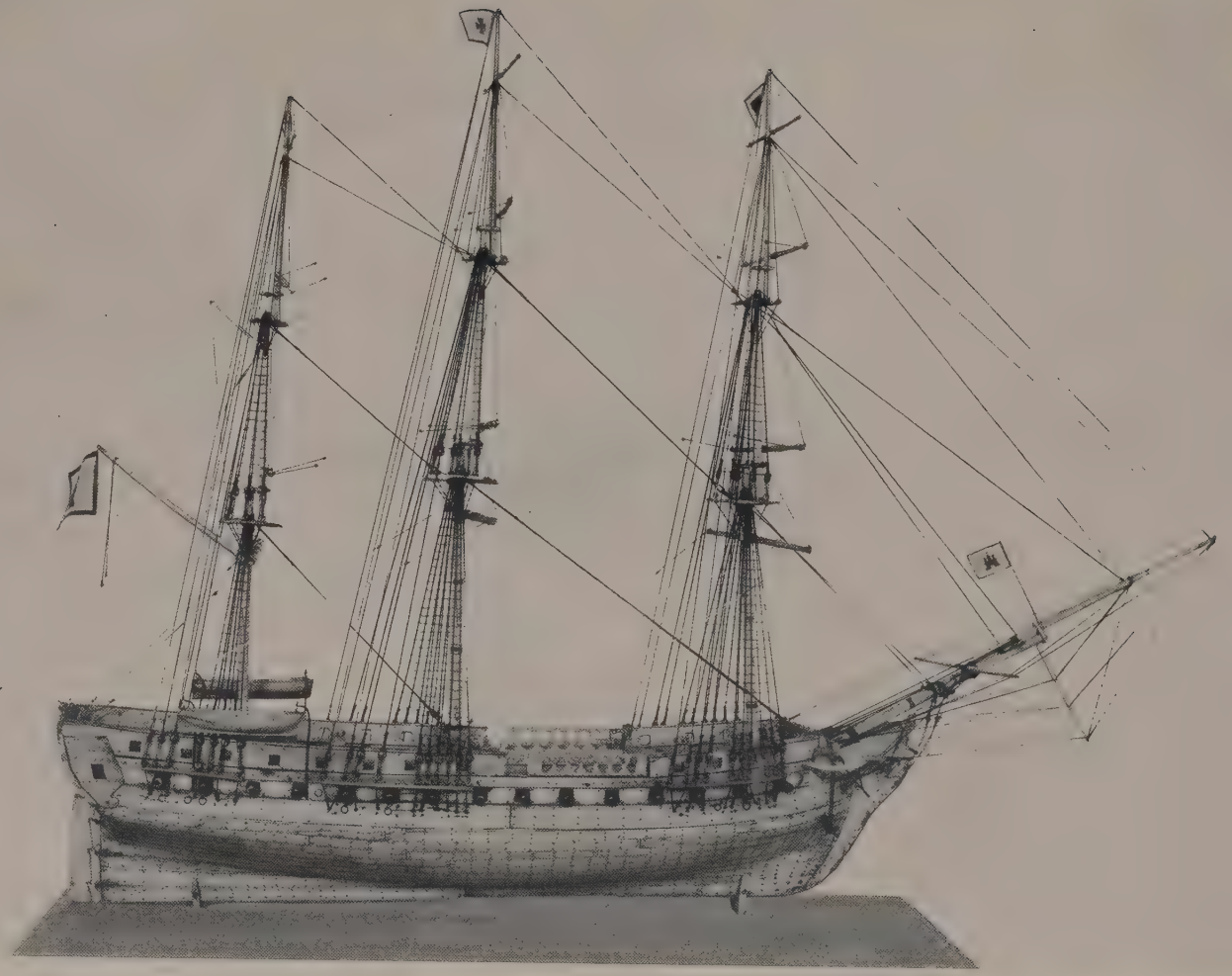
LIBRARY

Turkish Ship circa 1750 Model 1775
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Chinese Junk circa 1800
Leningrad, Marine Museum

LIBRARY



German Ship circa 1800
Hamburg, Museum für Hamburgische Geschichte

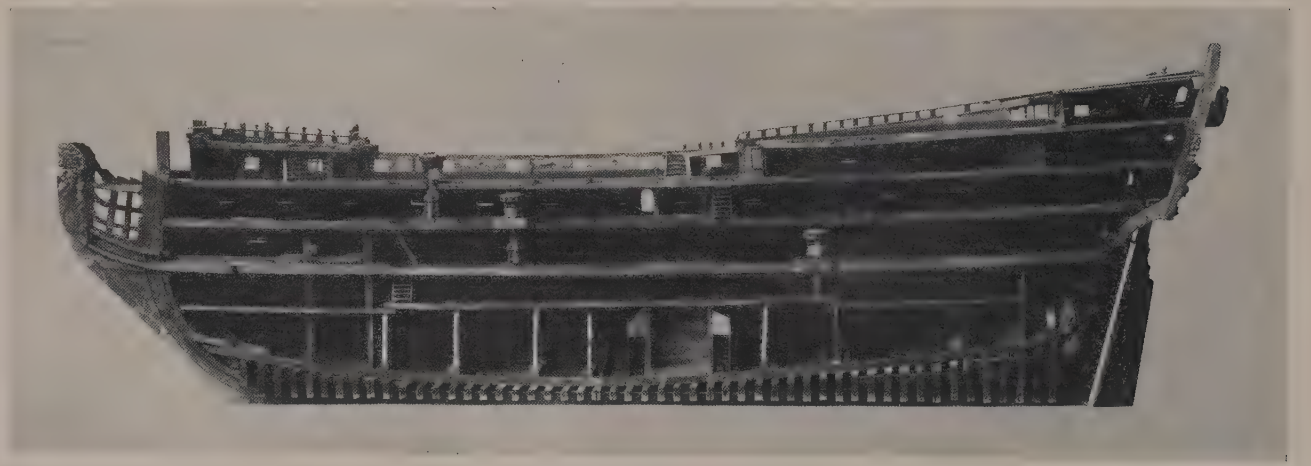
LIBRARY

Danish Corvette 1810

Elsinore, Kronborg Castle

UNIVERSITY OF
LIBRARY

Dutch Man-of-War "Koning der Nederlanden" 1842
Amsterdam, Rijksmuseum



Frigate "Augsburg"
In prossession of H. R. H. the Grandduke of Oldenburg

LIBRARY

Russian Brig "Olympus" 1817
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Russian Brig "Olympus" 1817
Leningrad, Marine Museum

UNIVERSITY OF ARIZONA
LIBRARY

Danish Two-Decker "Flora von Gunde" 1830
Berlin, Institut für Meereskunde

UNIVERSITY OF
LIBRARY

German Ship "Etienne" circa 1880
Hamburg, Museum für Hamburgische Geschichte

LIBRARY

German Ship "Antilope" 1890
Hamburg, Museum für Hamburgische Geschichte

LIBRARY

K78s

623.8 K78S

a39001 007354452b

66-11
67-11
72-11
73-1111
74-11

S0-EKW-738